

**BEFORE THE
PUBLIC SERVICE COMMISSION OF
SOUTH CAROLINA**

DOCKET NO. 2019-182-E

In the Matter of:)
)
South Carolina Energy Freedom Act)
(H.3659) Proceeding Initiated Pursuant)
to S.C. Code Ann. Section 58-40-20(C):)
Generic Docket to (1) Investigate and)
Determine the Costs and Benefits of the)
Current Net Energy Metering Program and)
(2) Establish a Methodology for Calculating)
the Value of the Energy Produced by)
Customer-Generators)

**DIRECT TESTIMONY OF
LEIGH C. FORD FOR DUKE
ENERGY CAROLINAS, LLC AND
DUKE ENERGY PROGRESS, LLC**

I. INTRODUCTION AND SUMMARY

Q. PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.

A. My name is Leigh C. Ford, and my business address is 1201 Main Street, Suite 1180, Columbia, South Carolina 29201.

Q. BY WHOM ARE YOU EMPLOYED AND IN WHAT CAPACITY?

A. I have been engaged by Duke Energy Carolinas, LLC (“DEC”) and Duke Energy Progress, LLC (“DEP”) and together with DEC, the “Companies”) as a consultant and I support the Companies’ regulatory and legal teams in the implementation of S.C. Act No. 62 of 2019’s (“Act 62”) new net energy metering (“NEM”) requirements.

Q. PLEASE DESCRIBE YOUR EDUCATIONAL BACKGROUND AND PROFESSIONAL EXPERIENCE.

A. I received a Bachelor’s Degree in Communications from Lenoir-Rhyne University in 2002. I joined the South Carolina Office of Regulatory Staff (“ORS”) in 2007 and served in a variety of positions, including a Rates and Regulatory Analyst, Manager of Electric Regulation, and as the Deputy Director for Electric and Natural Gas Regulation, through 2016. Prior to joining ORS, I was a Field Service Representative with the South Carolina Budget and Control Board. From 2016 – 2017, I was the Director of Strategy and Continuous Improvement for the South Carolina Department of Health and Environmental Control. From 2017 – 2019, I was employed by Proactive MD, first as the National Director for Operational Strategy and Processes and then as an Associate Vice President for Marketing and

1 Communications. I have served in my current role with the Companies since
2 August 2019.

3 **Q. HAVE YOU TESTIFIED BEFORE THE PUBLIC SERVICE COMMISSION**
4 **OF SOUTH CAROLINA (THE “COMMISSION”) IN ANY PRIOR**
5 **PROCEEDINGS?**

6 A. Yes, I have testified before the Commission on numerous occasions on behalf of
7 ORS, including rate cases involving DEC, South Carolina Electric & Gas Company
8 (“SCE&G”), and Lockhart Power Company, and annual fuel reviews for DEC,
9 DEP, and SCE&G. I also testified in Act 236-related proceedings, including the
10 NEM value of solar methodology and the investor owned utilities’ applications to
11 develop Distributed Energy Resource (“DER”) Programs. I also presented in an
12 allowable ex-parte briefing regarding renewable resources and their role in South
13 Carolina’s electric generation portfolio.

14 **Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY?**

15 A. The purpose of my testimony is to provide the Commission with a summary of the
16 Companies’ stakeholder engagement process, including stakeholder input, and how
17 this process impacted the Companies’ analyses.

18 **Q. ARE YOU INCLUDING ANY EXHIBITS IN SUPPORT OF YOUR**
19 **TESTIMONY?**

20 A. Yes. My testimony includes two exhibits: **Ford Direct Exhibit 1**, which is a copy
21 of the agenda, meeting minutes, and presentations for the March 12, 2020,
22 stakeholder meeting; and **Ford Direct Exhibit 2**, which is a copy of the agenda,
23 meeting minutes, and presentations for the April 24, 2020, stakeholder meeting.

1 **Q. WERE FORD DIRECT EXHIBITS 1 AND 2 PREPARED BY YOU OR**
2 **UNDER YOUR SUPERVISION?**

3 A. Yes, they were.

4 **Q. WHY ARE THE COMPANIES REEVALUATING THEIR NEM**
5 **PROGRAMS?**

6 A. On May 16, 2019, Governor Henry McMaster signed into law Act 62. One of Act
7 62's requirements is that the Commission establish a "generic" docket to, among
8 other things: 1) investigate and determine the costs and benefits of the current NEM
9 program; 2) establish a methodology for calculating the value of the energy
10 produced by customer-generators; 3) evaluate the utility's long-run marginal costs
11 of generation, distribution, and transmission; 4) consider the cost of service
12 implications on non-NEM customers within the same class as NEM customers; 5)
13 and consider any direct and indirect economic impacts of NEM.

14 In compliance with Act 62, the Commission opened a generic docket on
15 May 28, 2019, and established a procedural schedule that allowed the Companies
16 to work with stakeholders to exchange ideas and potential paths forward for not
17 only the existing NEM programs, but also the next generation of NEM envisioned
18 by Act 62.

19 **II. STAKEHOLDER ENGAGEMENT**

20 **Q. DID THE COMPANIES CONSULT WITH STAKEHOLDERS PRIOR TO**
21 **THE DATE OF THIS FILING?**

22 A. Yes. The Companies greatly appreciate stakeholder input and recognize that
23 collaboration can lead to comprehensive solutions and positive outcomes for all

1 parties. With this perspective and in the spirit of Act 62, the Companies organized
2 two stakeholder workshops to encourage stakeholder participation and solicit
3 feedback regarding the implementation of Act 62, the components of this generic
4 docket, and future NEM programs in South Carolina. The Companies used this
5 input to develop their filing.

6 The first stakeholder workshop was held on Thursday, March 12, 2020 with
7 42 participants. On Thursday, April 23, 2020, the Companies held another
8 stakeholder workshop, which had 47 participants in attendance. These workshops
9 informed the Companies' filings being made today.

10 **Q. WHAT WAS THE FORMAT OF THE WORKSHOPS?**

11 A. The March 12, 2020 workshop was held in person in Columbia, South Carolina
12 with an option for participants to attend remotely via GlobalMeet. While originally
13 planned as an in-person event, in light of the Covid-19 crisis the April 23, 2020
14 workshop was held remotely using GlobalMeet.

15 **Q. WHAT INFORMATION WAS PRESENTED AT THE WORKSHOPS?**

16 A. As evidenced by **Ford Direct Exhibit 1** and **Ford Direct Exhibit 2**, the Companies
17 presented information on topics of interest to the stakeholders. On March 12, 2020,
18 the Companies presented an overview of Act 62 as it relates to NEM and gave
19 presentations on long-run marginal costs, cost of service implications of customer
20 generators, and the Companies' future strategies regarding transmission and
21 distribution planning. A presentation on cost of service implications of customer
22 generators was also given by a representative from Vote Solar.

1 At the April 23 workshop, the Companies gave presentations on the value
2 of DER according to the Act 236 methodology, options for successor tariffs and
3 rate design based on examples from other states, and options for an Act 62
4 compliant tariff. A presentation on potential considerations when evaluating the
5 direct and indirect economic impacts of NEM in South Carolina was also given by
6 a representative from Sunrun, Inc.

7 **Q. DID THE COMPANIES ASK FOR FEEDBACK FROM PARTICIPANTS**
8 **OF THE WORKSHOP?**

9 A. Yes. The Companies requested feedback from participants regarding the cost-
10 benefit framework under Act 62, methods for determining the direct and indirect
11 economic impacts to the State, ideas for what integrated cost of service might look
12 like in the near-term or long-term future, the valuation of DER data, the impact of
13 time variability on the value of solar, long run marginal costs, the definition of
14 “local” under Act 62, and best practices from other jurisdictions.

15 **Q. GENERALLY, WHAT FEEDBACK DID YOU RECEIVE FROM THE**
16 **STAKEHOLDERS IN THE WORKSHOPS AND DURING THE**
17 **NEGOTIATION PROCESS?**

18 A. Stakeholders provided key feedback to the Companies throughout this process,
19 including suggestions: 1) to utilize economic experts in determining the cost and
20 benefits of DER to the electric system; 2) to consider the jobs created, income
21 invested in the local economy, and tax income generated by solar businesses when
22 determining the economic value of DER; 3) to define “local” under Act 62 as being
23 within the borders of the State of South Carolina; and 4) to consider locational-

1 specific incentives for customers when connecting to the grid. There was also
2 stakeholder discussion and comments as to reducing any cost shift and the
3 calculation of the value of solar. Stakeholders also held varying views on how to
4 define indirect versus direct economic impacts.

5 **Q. WHAT WAS THE OUTCOME OF THE STAKEHOLDER ENGAGEMENT**
6 **PROCESS?**

7 A. The Companies were very pleased with the stakeholder engagement and feedback,
8 and believe the parties have achieved a better common understanding of key terms
9 and concepts in matters related to this docket. For example, stakeholder feedback
10 helped shape the Companies' analyses in this filing, and the information we
11 received about topics of interest also helped influence the level of detail the
12 Companies' witnesses provided in this proceeding to ensure there is a common
13 understanding of key terms. Additionally, the Companies agree with the feedback
14 from stakeholders that the definition of "local" economic impact under Act 62
15 should remain within the State's borders. Finally, the Companies determined that
16 the consideration of indirect and direct economic impacts should be addressed by
17 experts and have submitted such considerations in the direct testimony of Witness
18 Wright.

19 The Companies appreciate the time allowed by the Commission to work
20 with stakeholders, and believe this engagement was productive and will lead to a
21 more efficient proceeding. The Companies intend to continue this stakeholder
22 collaboration to the extent possible throughout this proceeding.
23

III. CONCLUSION

1

2 **Q. DOES THIS CONCLUDE YOUR PRE-FILED DIRECT TESTIMONY?**

3 A. Yes, it does.

Net Energy Metering Stakeholder Meeting
March 12, 2020, 10:00 am – 1:00 pm
1201 Main Street, 3rd Floor Conference Room, Columbia, SC
or Remotely via GlobalMeet

[Click this Link to Join Webinar](#)

Dial-in: (712) 770.4203; Participant Code: 285616

Agenda:

10:00 – 10:15

Safety Briefing – Jacob Colley
Introductions – Round Table
Ground Rules – Leigh Ford

10:15 – 10:30

Overview of Act 62 and NEM – Ashley Cooper
Overview of Stakeholder Process – Thad Culley and Leigh Ford

10:30 – 12:15

Utilities Presentations and Q&A
Long-run Marginal Costs, Cost of Service implications of customer-generators

10:30 – 11:15 – Duke Energy and Q&A

Presenters: George Brown, General Manager of Distributed Energy Technology,
Policy, and Strategic Investment
Lon Huber, Vice President, Rate Design and Strategic Solutions

11:15 – 11:30

Break

11:30 – 12:00

Stakeholder Presentations
Cost of Service implications of customer-generators and Q&A
Presenters: Thad Culley, Regional Director, Vote Solar

12:00 – 12:30

Utilities Presentations and Q&A
T&D Planning

Duke Energy and Q&A

Presenters: Mark Oliver, Managing Director Integrated System Planning

12:30 – 1:00

Wrap Up and Next Steps

Meeting Location:

1201 Main Street
3rd floor Conference room
Columbia, SC 29201.

Public parking is available in the garage adjacent to the building. Entrance to the parking garage is located on Lady Street.

Contact Info:

Leigh Ford
803-528-5598
Leigh.ford@duke-energy.com

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To Join by Phone ONLY

Dial-in: (712) 770.4203; Participant Code: 285616

Net Energy Metering Stakeholder Meeting
March 12, 2020, 10:00 am – 1:00 pm
1201 Main Street, 3rd Floor Conference Room, Columbia, SC
or Remotely via GlobalMeet

Welcome:

Leigh Ford of Duke Energy welcomed stakeholder participants.

Safety Briefing:

Jacob Colley of Duke Energy provided a safety briefing regarding the Corona virus.

Ground Rules:

Leigh Ford explained that the intent of the collaborative is to share ideas and develop the new net metering tariff. General ground rules include:

- Share what's on your mind.
- Be present and challenge assumptions, yours included.
- Focus on our shared interests and set aside differences.
- In order to create an atmosphere of trust and openness, comments by participants, observers, and hosts should be treated as confidential and not repeated in traditional media, social media channels, or in future litigation.

Leigh Ford volunteered to serve as the secretary and the stakeholders agreed.

Overview of Act 62 and NEM:

Ashley Cooper of Parker Poe provided an overview of Act 236 and Act 62.

Discussion of whether Act 236 terminates or sunset after 10 years.

Overview of Stakeholder Process:

Thad Culley of Vote Solar discussed the successful passage of Act 62 and how we hope to use the stakeholder process to develop a successor tariff that's just and reasonable in light of benefits while determining the proper methodology. He discussed what's been considered in other states and South Carolina leveraging the what's been done around the country.

Leigh Ford addressed the proposed timeline leading up to the PSC's requirement that a new solar choice metering tariff be in place by June 1 of 2021. Due to billing system updates, Duke would like to have an Order by end of 2020 or the beginning of 2021.

Stakeholder Timeline:

- 3/12/2020 – Stakeholder Meeting #1
- 4/23/2020 – Stakeholder Meeting #2
- 6/1/2021 – Solar Choice Metering Tariff in effect

Duke Timeline:

- May 2020 – Negotiations Begin
- July 2020 – Duke files new Solar Choice Metering Tariff
- December 2020 – Duke Order Issued

Mark Furtick of Dominion Energy SC: Dominion has more leeway on their timing. Due to existing regulatory proceedings and their merger, their timeline will be 2- 3 months behind Duke.

Discussion of Duke's progress on its Customer Connect.

Duke Energy Presentation - Long-run Marginal Costs, Cost of Service implications of customer-generators

Presenters:

George Brown, General Manager of Distributed Energy Technology, Policy, and Strategic Investment

Lon Huber, Vice President, Rate Design and Strategic Solutions

Lon Huber introduced himself and described his experience throughout the country, specifically his work on net metering reform. Lon provided a residential rate design overview and presented data from Duke's actual solar customers.

Discussion on rate design, cost recovery, and data provided by Duke.

George Brown spoke about the value of solar framework and how to build out benefits and costs stacks in making that calculation.

Stakeholder Presentation – Cost of Service implications of customer-generators

Presenter: Thad Culley, Regional Director, Vote Solar

Thad from Vote Solar presented on cost of service studies and methodologies and provided examples of other states that have recently revised their NEM framework.

Lon Huber noted that California's design was intentional because of the policy structure in California to have higher use customers fund policy initiatives in the state.

Discussion on what integrated COS might look like in near term or long term.

Duke Energy Presentation – T&D Planning

Presenters: Mark Oliver, Managing Director Integrated System Planning

Mark Oliver presented on Duke's Integrated Systems & Operations Planning process. There is an ISOP workshop scheduled for April 27 in Columbia but this may change. Information on Duke's ISOP can be found at the Company's portal: <https://www.duke-energy.com/our-company/isop>

Discussion on valuation and the availability of detailed DER data.

Wrap Up and Next Steps

Leigh Ford will send the group the slides and meeting minutes. If there are any additions to the stakeholder participants, please notify Leigh. If you need to sign an NDA with Duke contact Heather Shirley Smith, Ashley Cooper, or Leigh Ford. If you need to sign an NDA with Dominion contact Mark Furtick or Kelly Arms.

The next NEM stakeholder meeting will take place April 23.

Attendees:

<u>Attendee</u>	<u>Organization</u>
Kelly Arms	Dominion Energy SC
Andrew Bateman	ORS
Sharad Bharadwaj	E3
Kullen Boling	Central Electric Power Cooperative
Robert Branton	Santee Cooper
Daniel Brookshire	NC Sustainable Energy Association
George Brown	Duke Energy
John Calhoun	Santee Cooper
Steve Chriss	Walmart
Sarah Cohen	SC Chamber of Commerce
Jacob Colley	Duke Energy
Ashley Cooper	Parker Poe
Thad Culley	Vote Solar
Tom Delello	Gregory Electric
Scott Elliott	SC Energy Users Committee
Leigh Ford	Duke Energy
Mark Furtick	Dominion Energy SC
Tyson Grinstead	Sunrun
Carrie Grundmann	Walmart
Dawn Hipp	ORS
Brian Horii	E3
Lon Huber	Duke Energy
Maia Hutt	Southern Environmental Law Center
Bryan Jacob	Southern Alliance for Clean Energy
Robert Lawyer	ORS
Jason Martin	Duke Energy
Lyndsey McNeely	Duke Energy
Eddy Moore	SC Coastal Conservation League
O'Neil Morgan	ORS
David Neal	Southern Environmental Law Center
Mark Oliver	Duke Energy
Justin Orkney	Duke Energy
Lisa Perry	Walmart
Marcus Preston	Duke Energy
Cole Price	Central Electric Power Cooperative
Shelley Robbins	Upstate Forever
John Rouff	AARP
Michael Seaman-Huynh	ORS
Heather Shirley Smith	Duke Energy
Ben Smith	NC Sustainable Energy Association
Neal Williams	Lockhart Power
Bruce Wood	Sunstore

Welcome!

Net Energy Metering Stakeholder Meeting
March 12, 2020, 10:00 am – 1:30 pm

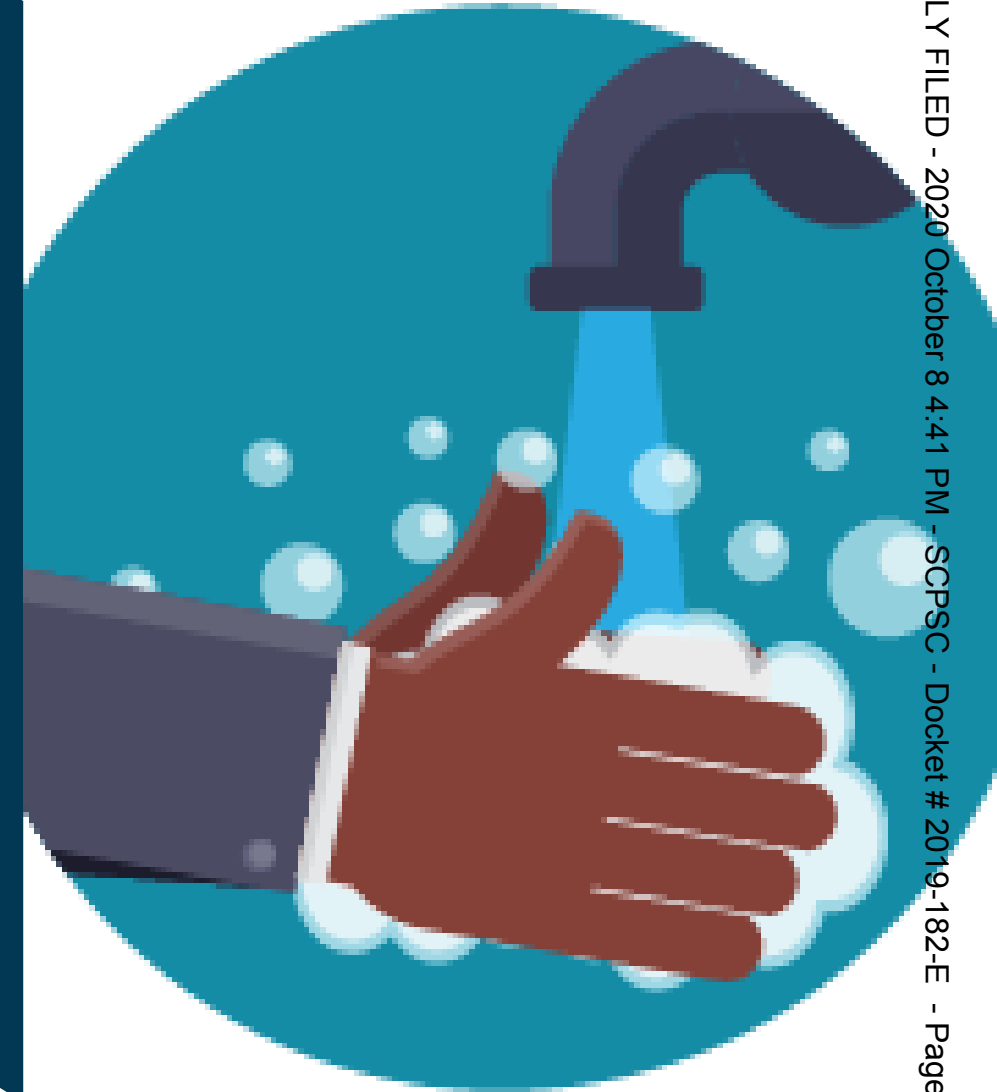
Safety Moment

Jacob Colley, DET Stakeholder Engagement Manager



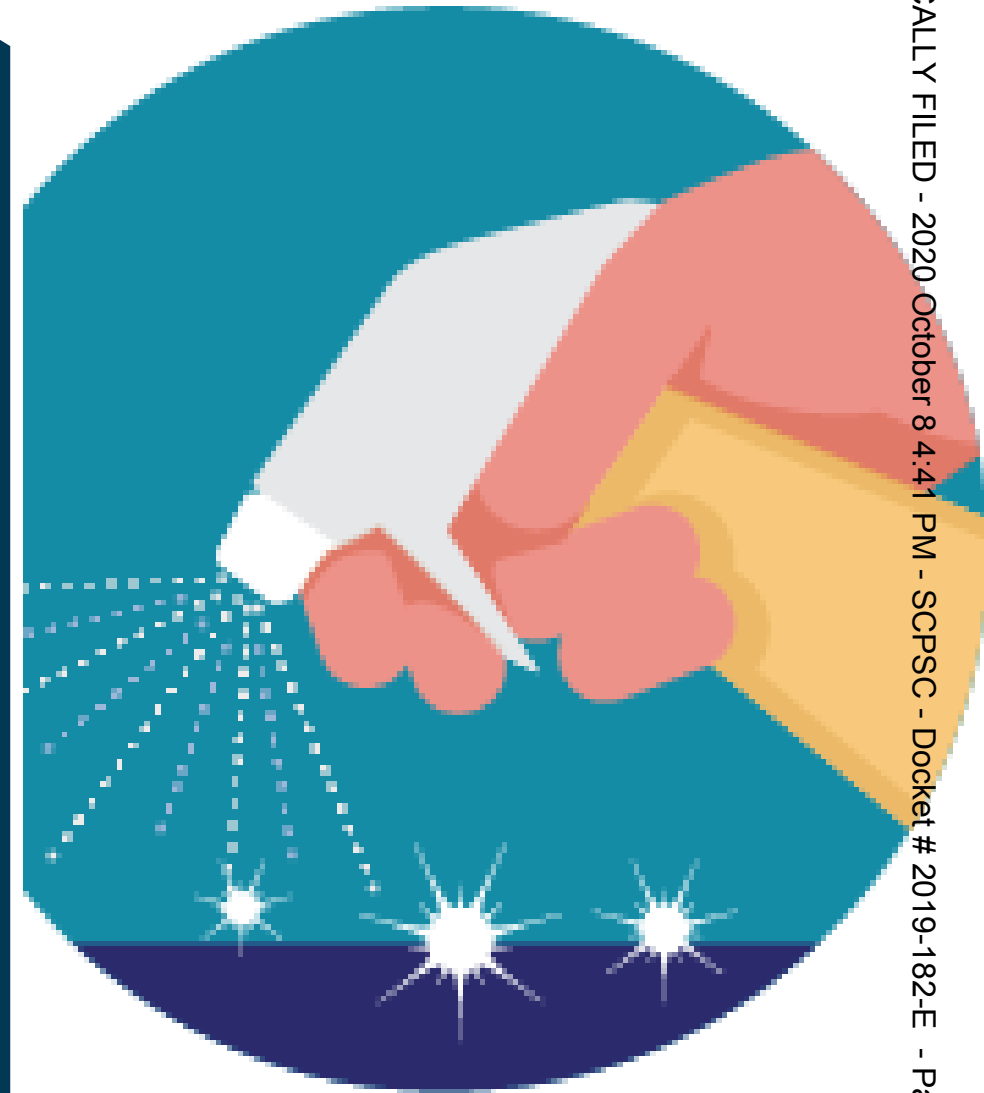
Safety Moment – Recommended Precautions for Patient Caregiving (CDC.gov)

- Make sure that you understand and can help the patient follow their healthcare provider's instructions for medication(s) and care.
- Help with basic needs – e.g. getting groceries, prescriptions, etc.
- Monitor the patient's symptoms.
- Household members should be separated from the patient as much as possible – e.g. use a separate bedroom and bathroom, if available.
- Prohibit non-essential visitors
- Do not allow pets or other animals to be handled
- Make sure that shared spaces in the home have good air flow, such as by an air conditioner or an opened window.
- Perform hand hygiene frequently - wash your hands often and always thoroughly
- Avoid touching your eyes, nose, and mouth with unwashed hands.



Safety Moment – Recommended Precautions for Patient Caregiving (CDC.gov)

- The patient should wear a facemask when around other people.
 - Wear a disposable facemask and gloves when you touch or have contact with the patient's body fluids
 - First remove and dispose of gloves, then, immediately clean your hands with soap and water or alcohol-based hand sanitizer.
 - Next, remove and dispose of facemask, and immediately clean your hands again with soap and water or alcohol-based hand sanitizer.
 - Place all used disposable gloves, facemasks, and other contaminated items in a lined container before disposing of them with other household waste.
- Avoid sharing household items with the patient – dinnerware, napkins, quilts/throws, etc.
- Clean all “high-touch” surfaces, such as counters, doorknobs, phones, tablet, etc. daily
- Wash laundry thoroughly.
- Discuss any additional questions with your state or local health department or healthcare provider.



Act 62

Solar Choice Stakeholder Meeting 1

NEM under Act 236

Any and all costs prudently incurred pursuant to the provisions of this chapter by an electrical utility as approved by the commission and any and all commission approved benefits conferred by a customer-generator shall be recoverable by each entity respectively in the electrical utility's rates in accordance with these provisions:

- (1) The electrical utility's general rates, tariffs, and any additional monthly charges or credits, in addition to any other charges or credits authorized by law, to recover the costs and confer the benefits of net energy metering shall include such measures necessary to ensure that the electrical utility recovers its cost of providing electrical service to customer-generators and customers who are not customer-generators.
- (2) Any charges or credits prescribed in item (1), and the terms and conditions under which they may be assessed shall be in accordance with a methodology established through the proceeding described in item (4). The methodology shall be supported by an analysis and calculation of the relative benefits and costs of customer generation to the electrical utility, the customer-generators, and those customers of the electrical utility that are not customer-generators.
- (3) Upon approval of the methodology provided for in item (4), each electrical utility shall file its analysis of the net cost to serve customer-generators using the approved methodology and shall propose new net energy metering rates.
- (6) In the event that the commission determines that future benefits from net energy metering are properly reflected in net metering rates because they provide quantifiable benefits to the utility system, its customers, or both, and to the degree such benefits are not then being recovered by the electrical utility in its base rates, then such future benefits shall be deemed an avoided cost and shall be recoverable pursuant to Section 58-27-865 by the electrical utility as an incremental cost of the distributed energy resource program.

Solar Choice under Act 62

Solar Choice is an NEM program that (i) arises from Act 62 and (ii) was not specifically contemplated by Act 236. As such, S.C. Code Ann. § 58-40-20(F)(3), as implemented by Act 62, addresses the tariff methodology for this new NEM program:

- A solar choice metering tariff shall include a methodology to compensate customer-generators for the benefits provided by their generation to the power system. In determining the appropriate billing mechanism and energy measurement interval, the commission shall consider:
 - (a) current metering capability and the cost of upgrading hardware and billing systems to accomplish the provisions of the tariff;
 - (b) the interaction of the tariff with time-variant rate schedules available to customer-generators and whether different measurement intervals are justified for customer-generators taking service on a time-variant rate schedule;
 - (c) whether additional mitigation measures are warranted to transition existing customer-generators; and
 - (d) any other information the commission deems relevant.

Restrictions on value of solar in Act 62

S.C. Code Ann. §§ 58-40-20(A)(3), 58-40-20(G)(1), and 58-40-20(I), each as amended by Act 62, work in conjunction to prohibit (under the new tariffs):

- (i) recovering “lost revenues” for net metering in the manner formerly allowed by Act 236;
- (ii) cost-shift associated with [Solar Choice] to the greatest extent practicable; and
- (iii) subsidization associated with [Solar Choice] to the greatest extent practicable.

Recovery under Act 62

In contrast to Act 236, Act 62 does not expressly address cost recovery for NEM programs. Rather, Act 62 indicates that:

(I) Nothing in this section, however, prohibits an electrical utility from continuing to recover distributed energy resource program costs in the manner and amount approved by Commission Order No. 2015-194 for customer-generators applying before June 1, 2021. Such recovery shall remain in place until full cost recovery is realized. Electrical utilities are prohibited from recovering lost revenues associated with customer-generators who apply for customer-generator programs on or after June 1, 2021.

NEM and Cost of Service

Lon Huber, VP Rate Design and Strategic Solutions

March 12, 2020



Agenda

- Residential Rate Design
- Act 62 Requirements
- Data on Customer Generators in SC
- Legacy Value of Solar Framework

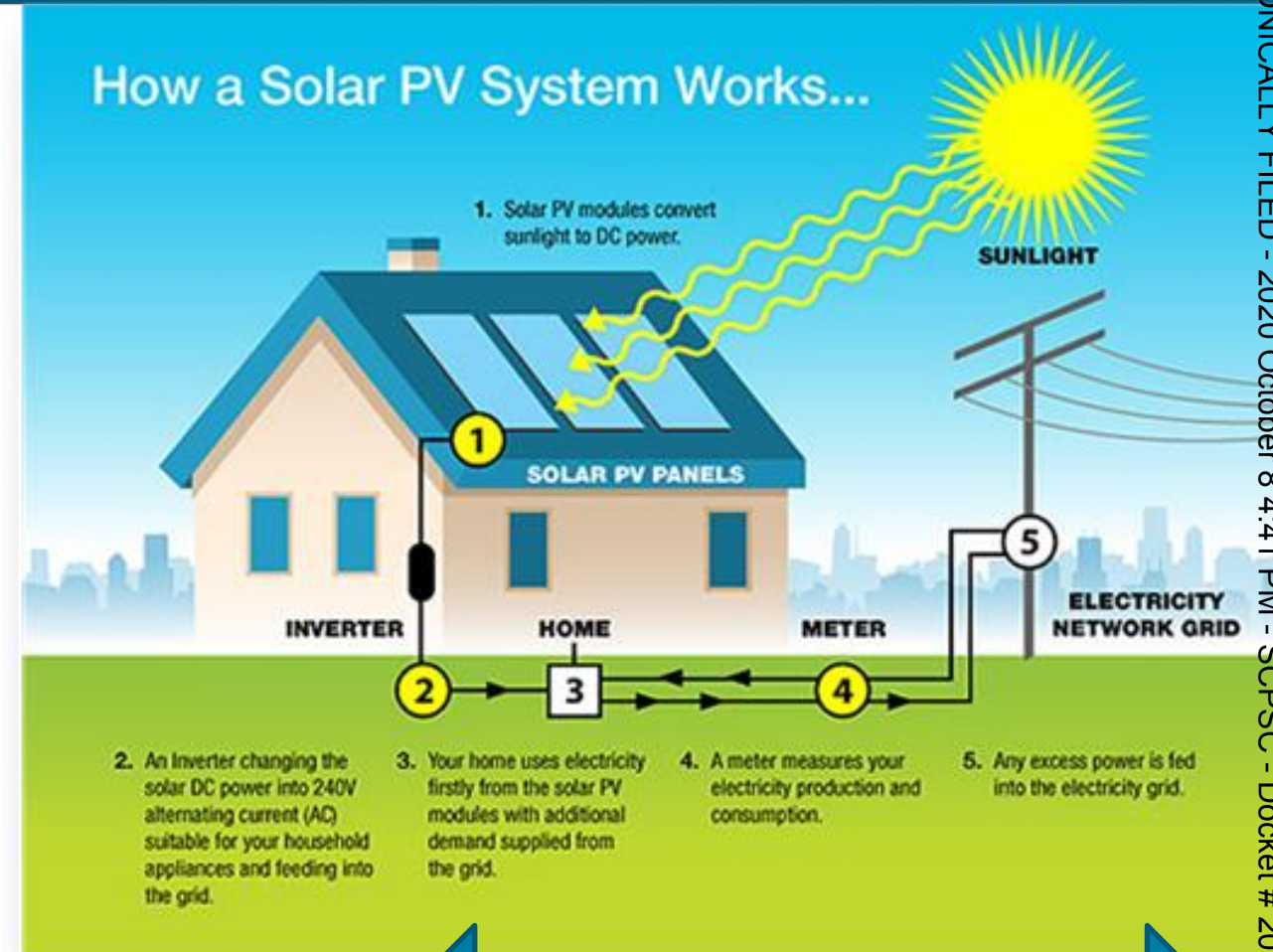
Residential Rate Design - How do Utilities Recover Their Costs?

Duke Energy Carolinas (DEC)

Duke Energy Progress (DEP)


Balancing the System in Real Time


- System operators match generation to demand in real time on a minute-to-minute and hour-to-hour basis.
- In any given minute or hour an NEM customer may be consuming power from the grid if their solar rooftop system is not producing enough power for their home's needs.
- Conversely, in any given minute or hour, the rooftop system may be producing more power than needed at the home resulting in exports of power to the grid.
- Does the current NEM framework accurately price the cost to serve customers and pay customers the marginal value of the excess power?




At any point in time power can flow from the grid into the home or conversely from the home onto the grid

Cost Classifications

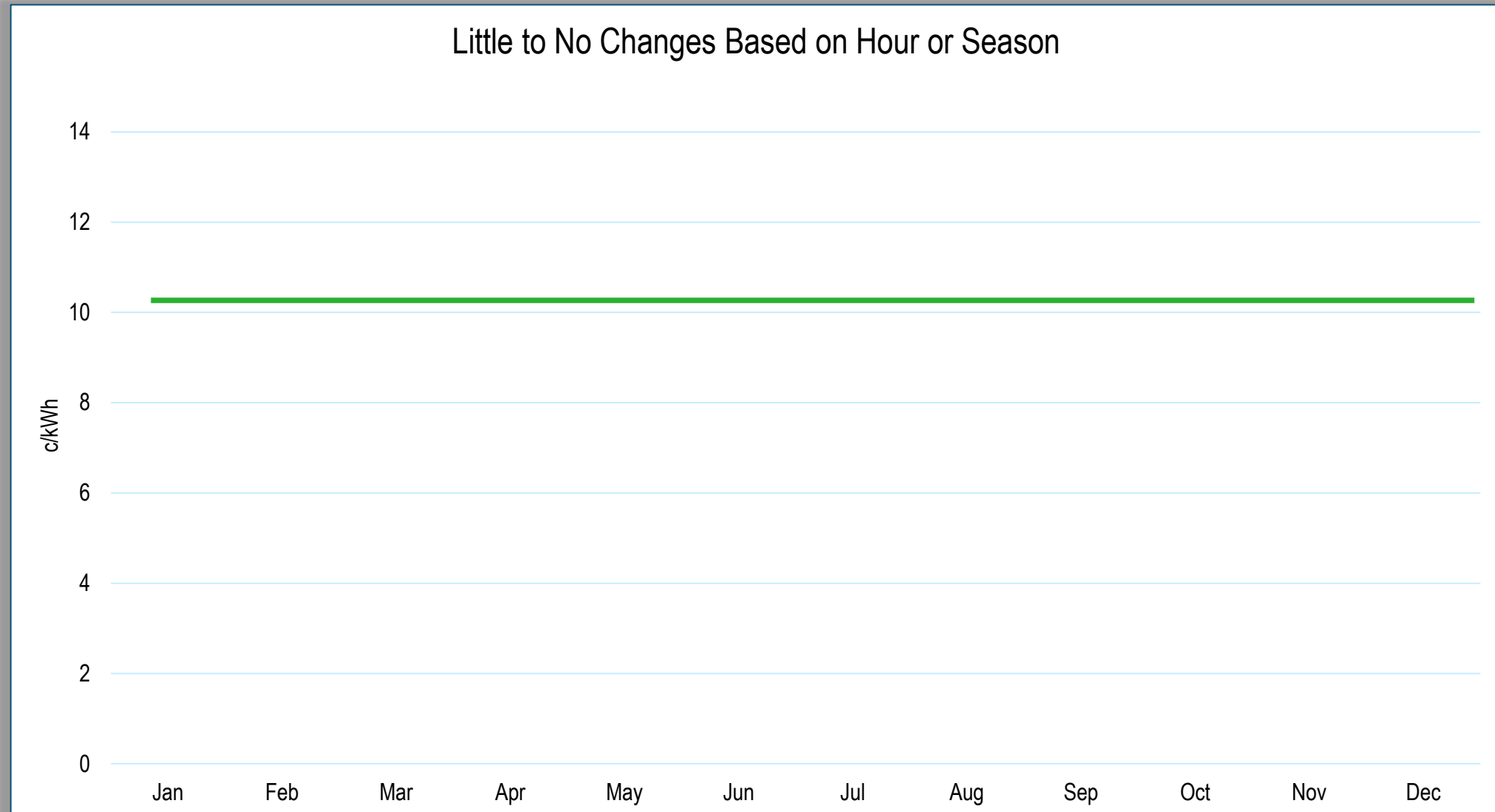
- **Energy** 
 - Unit: kWh
 - Examples: fuel, purchased power, emissions
 - ~20% of residential costs in DEC, ~35% of costs in DEP

- **Customer** 
 - Unit: per customer
 - Examples: cost of connection and minimum distribution, billing, customer support
 - ~20% of residential costs in both DEC and DEP (SC)

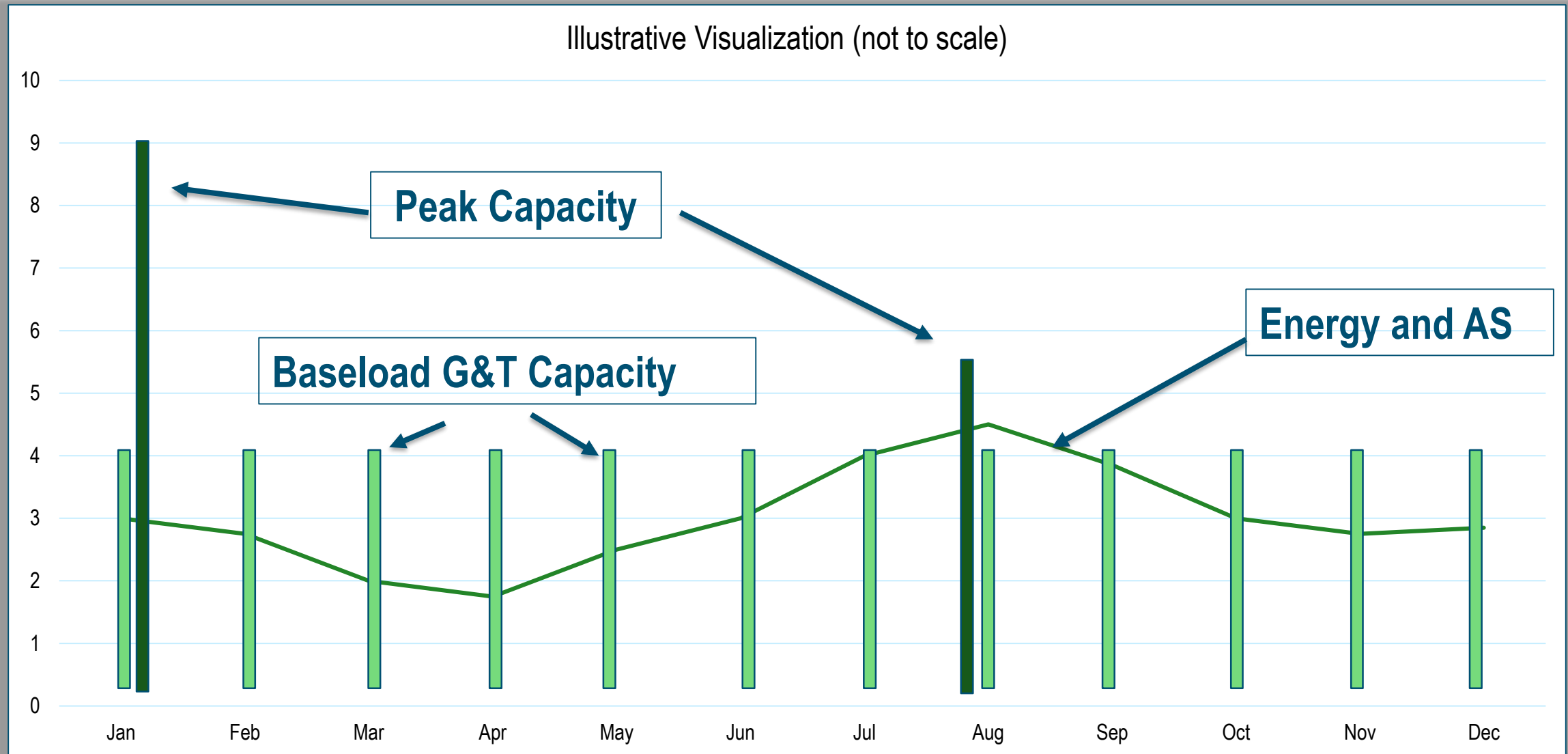
- **Demand (Capacity)** 
 - Unit: kW
 - Comprised of production/generation, transmission, and distribution
 - ~60% of residential costs in DEC, ~45% of costs in DEP
 - “Like maintaining a highway with 100 lanes”

- Industry and company trends point to customer and demand costs increasing as a percentage of total costs

Typical Residential Rate Design...






However, in Reality...



Cost Recovery Structure Favors NEM Customers

For a Typical DEC-SC NEM Customer Before Adding Solar:

- Energy 
 - ~20% of residential cost of service
 - ~90% of revenue through volumetric energy charge
 - Easiest charge to offset through NEM
- Customer 
 - ~20% of residential cost of service
 - ~8% of revenue through fixed charge
- Demand (Capacity) 
 - ~60% of residential cost of service
 - 0% of revenue through demand charge

Legal Requirements

Act 62 – Cost of Service and Solar Choice Tariff

Legacy NEM Analysis

- “The cost of service implications of customer-generators on other customers . . . including an evaluation of whether customer-generators provide an adequate rate of return to the electric utility . . . [58-40-20(D)(2)]

Solar Choice Tariff Requirements

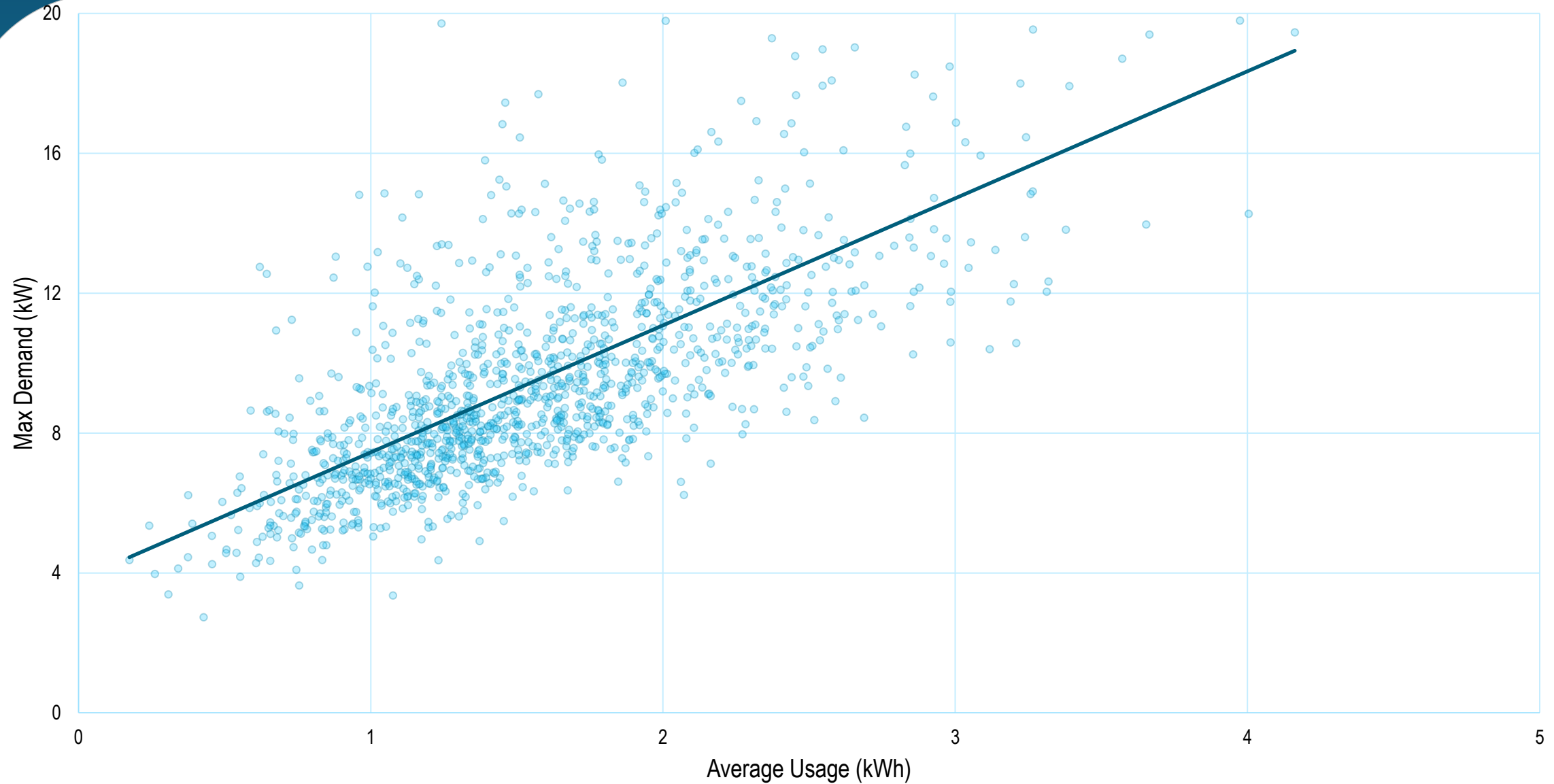
- “Eliminate any cost shift to the greatest extent practicable” . . . “while also ensuring access to customer-generator options for customers” . . . [58-40-20(G)(1)a]
- “Permit solar choice customer-generators to use customer-generated energy behind the meter without penalty” [58-40-20(G)(1)b]

Data on Customer Generators in SC

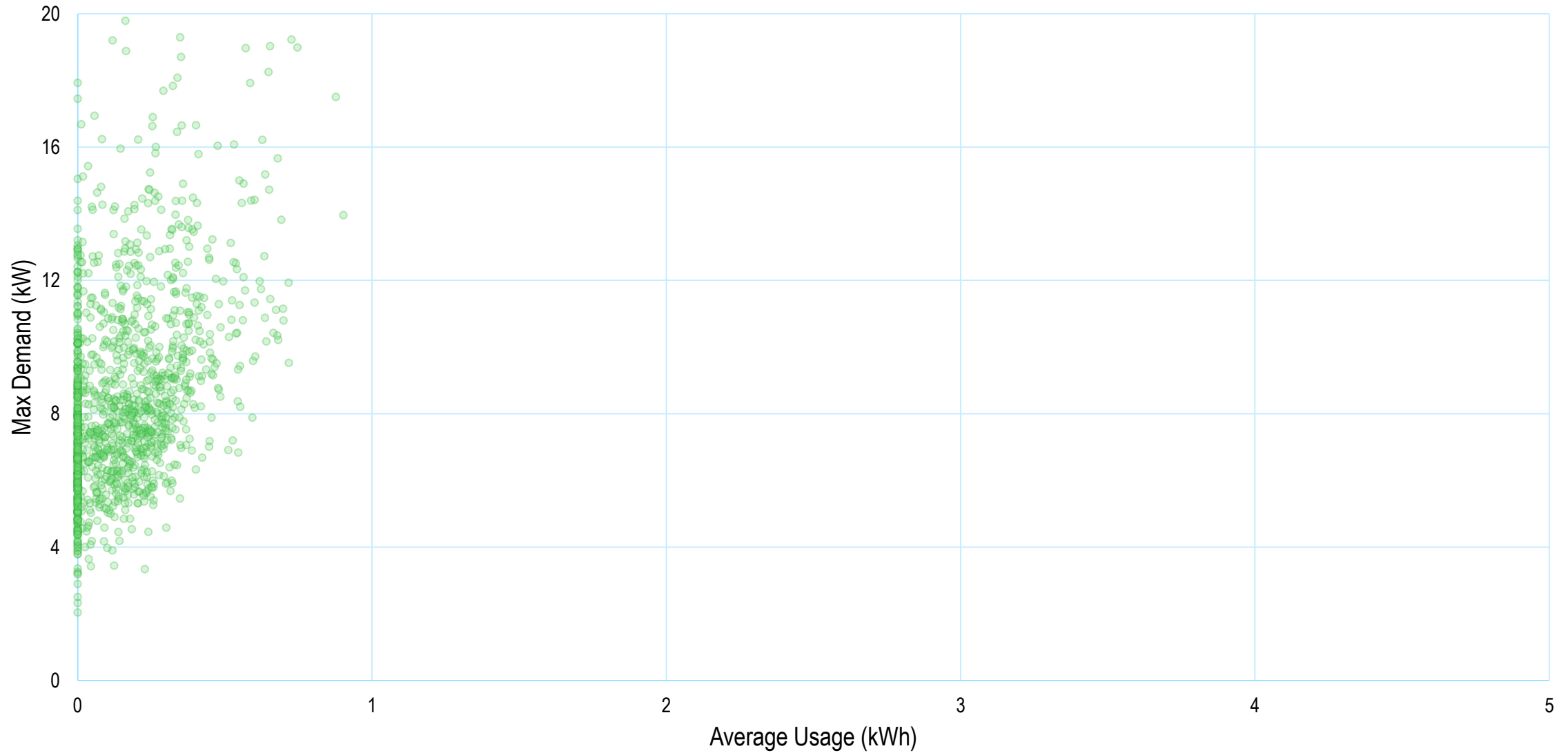
NEM Data Set

- 2019 data from 3,103 customers in DEC-SC
- Utilized subset of 1,300 customers that represents the average system size to load ratio:
 - Data collected for at least 9 months worth of data
- Average Load for Subset: 1,150 kWh
 - Average for residential class in DEC-SC: 1,070 kWh
- Average Solar Generation for subset: 1,035 kWh

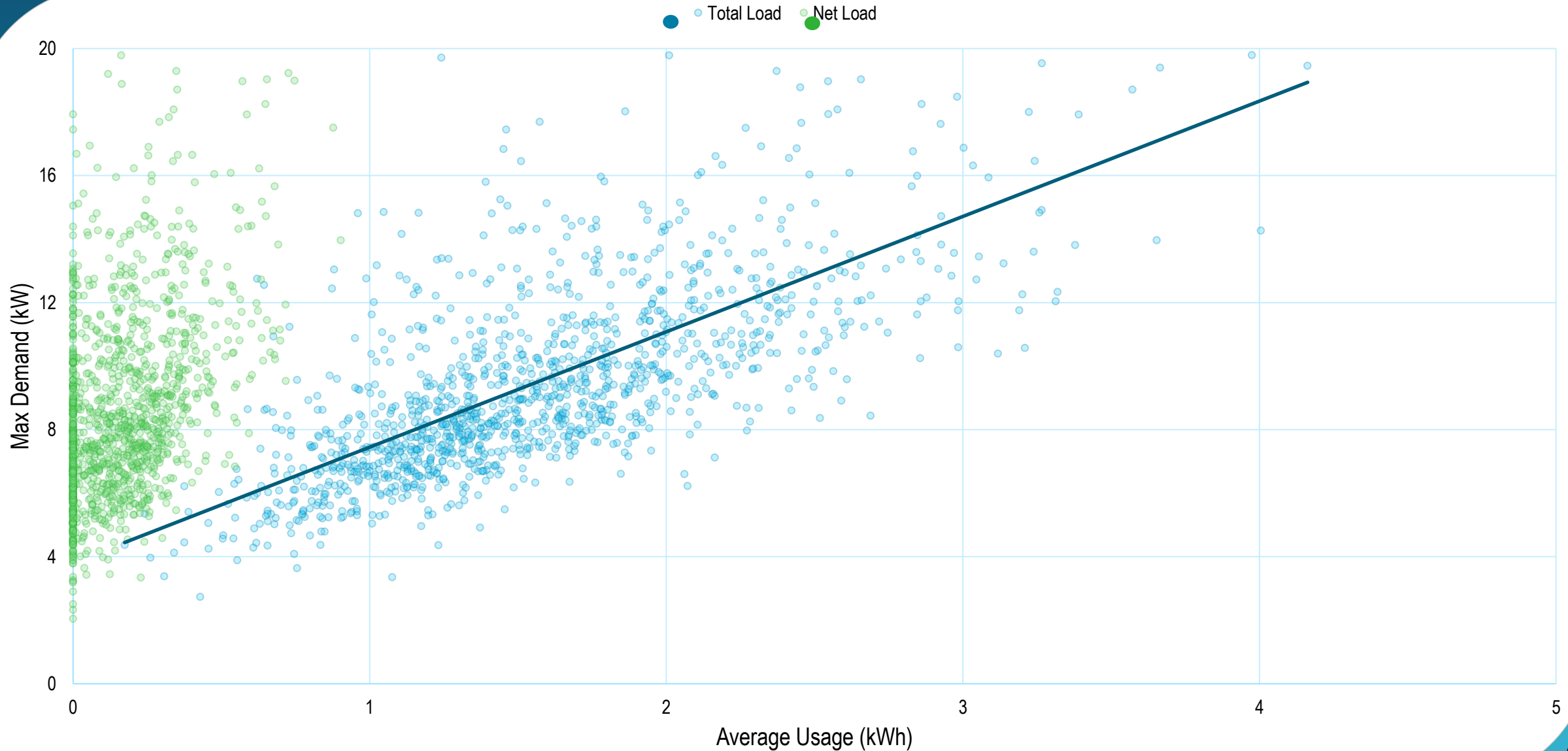
Conventional Rates Roughly Reflect CoS with Non-Solar Customers Because of Correlation Between Usage and Demand



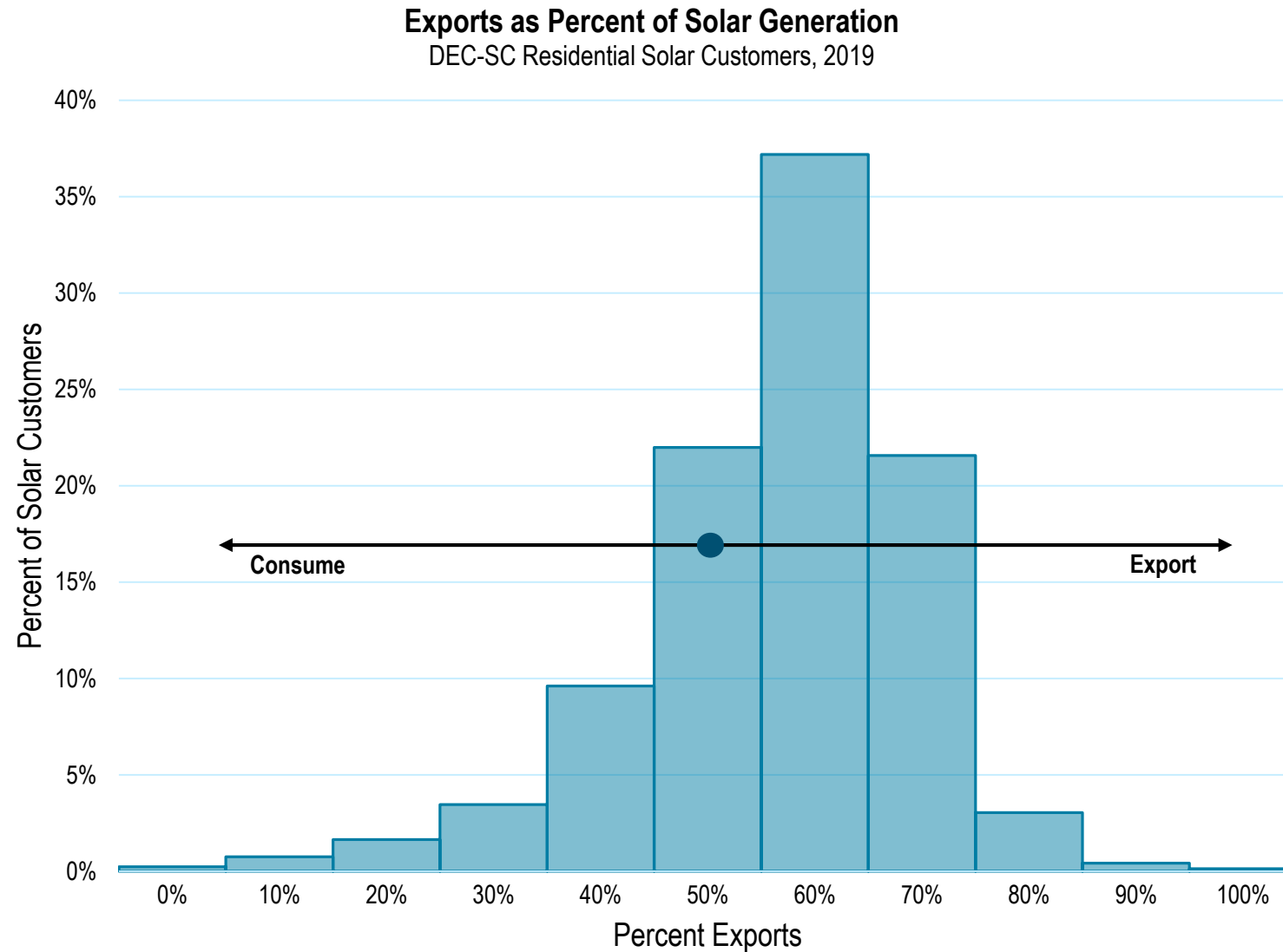
Solar Removes Correlation Between Demand and Usage



High Volumetric Rates are Not Appropriate for High-Demand, Low Usage Customers

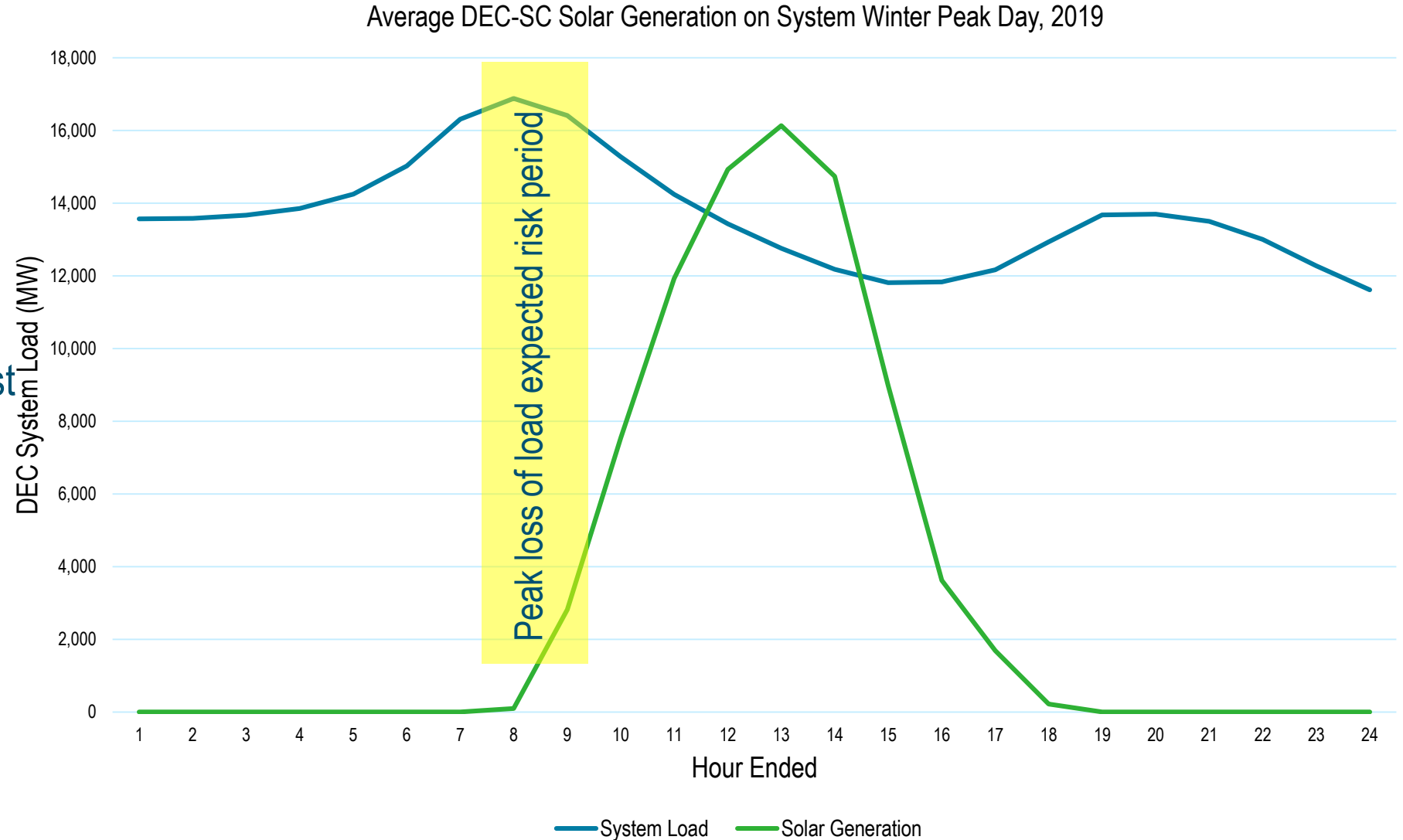


The Average DEC SC Customer Exports 57% of the Energy They Produce



Solar Production is not Coincident with Loss of Load Risk Hours

- ~90% of annual expected loss of load risk for DEC occurs in Winter
- The hours ended 7 through 9 have the highest loss of load risk
- Rooftop solar generation produces little energy during these hours



Legacy Value of Solar Framework

George Brown, General Manager of DET Policy and Strategic Investment

Legacy Structure – Utility Collects Contribution Shortfall

- Estimate the Contribution Shortfall from NEM Solar customers after giving the customer credit for the System Benefits resulting from NEM – two step calculation:
- Step 1: Revenue Gap from the NEM Solar customer equals Average Revenue Without NEM Solar minus Average Revenue with NEM Solar
- Step 2: Contribution Shortfall equals the Revenue Gap minus System Benefits (Value of Solar multiplied by all Solar Production)
- Aggregated Contribution Shortfall (also called the NEM Incentive) is collected from all customers via the Distributed Energy Resource Program

Refinements to Net Metering Framework since Act 236

- Utilize average NEM customer data rather than average residential data
 - Production meters have allowed for the collection of data from actual NEM customers instead of modeled NEM customers
 - NEM customers consume more energy than the average residential customer
- Align with methodology of DSM/EE programs
 - Utilize standard methods across energy resources

Legacy Net Energy Metering (“NEM”) Methodology

- +/- Avoided Energy
- +/- Energy Losses/Line Losses
- +/- Avoided Capacity
- +/- Ancillary Services
- +/- Transmission and Distribution (“T&D”) Capacity
- +/- Avoided Criteria Pollutants
- +/- Avoided CO₂ Emission Cost
- +/- Fuel Hedge
- +/- Utility Integration & Interconnection Costs
- +/- Utility Administration Costs
- +/- Environmental Costs
- = **Total Value of NEM Distributed Energy Resource**





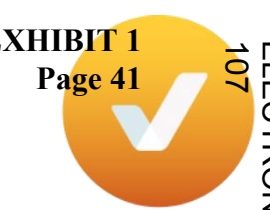
VOTE SOLAR

Cost of Service Study for Customer-Generators in Act 62

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Regulatory Counsel, Vote Solar**

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March 12, NEM Technical Workshop



§ 58-40-20 (D)(2)

- In evaluating the costs and benefits of the net energy metering program, the commission shall consider:
 - “the cost of service implications of customer-generators on other customers within the same class, including an evaluation of whether customer-generators provide an adequate rate of return to the electrical utility compared to the otherwise applicable rate class when, for analytical purposes only, examined as a separate class within a cost of service study;”



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Why include a COSS for evaluating NEM?

- A cost of service study can provide a relatively standardized perspective on whether net metered customers are paying more or less than what it costs the utility to serve them under a given tariff (and within a specific rate class)
- In Act 62, it is recognized as a necessary component to evaluating the costs and benefits of net metering, but is not solely determinative of whether a subsidy exists or what the successor tariff should be
- A purely wholesale value (value of solar) approach fails to capture the other aspects of a customer-generator that influence the cost to serve and benefit or burden the system (contributions to peak demand, nature and character of use of the system)

What does a COSS tell us about NEM?

- Do C-G have a unique cost of service when analyzed separately?
- How much revenue do C-Gs contribute toward the cost of service?
- Is there a potential cost shift between customers within a class with and without behind the meter solar?
- Do C-G produce any allocation benefits to the class by reducing contribution to system peaks or other cost drivers?
- How does rate design influence revenue collection?



What doesn't a COSS tell us about NEM?

- What is the value of solar to the system?
- Conclusive evidence of cross-subsidization? (No!)
- Economic benefits to the state?
- Can solar displace future generation, transmission, or distribution capacity? (not in embedded COSS)
- What are the long-term benefits of solar?



Data needs for a NEM COSS (Examples, not exhaustive)

- Load research (8760 data) that includes statistically significant number of C-G or interval data from all C-Gs using smart meters
- Interval production data from C-G systems (to match to 8760 load data)
- Program data (customer count, installed capacity, rate of adoption, tilt and azimuth)
- Historic load data (before C-G installed solar) for comparison



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Examples from other jurisdictions

- Utah PSC NEM framework
- Oklahoma Gas & Electric 2015 rate case
- 2013 E3 NEM Evaluation
- New Hampshire NEM 2.0 Docket
- Louisiana PSC Consultant Report

NOTE: Vote Solar does not necessarily endorse any of these approaches as a model and many represent utility litigation positions. These examples are offered here solely for purposes of discussion and illustrating the range of results.



Utah: PSC Cost-Benefit Framework

- Utah PSC required by statute to “determine a just and reasonable charge, credit, or ratemaking structure, including new or existing tariffs, in light of the costs and benefits” [of the net metering program].
- PSC rejected \$4.25/month NEM facilities charge in 2014 GRC because the record lacked cost-benefit information (statute passed after application filed).
- PSC ordered RMP to undertake load research study on customer-generators and opened a separate docket to explore the determination of costs and benefits.
 - Phase 1: Development of NEM cost-benefit framework
 - Phase 2: Application of framework to determine costs and benefits and to establish a just and reasonable charge, credit or ratemaking structure



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Utah PSC: NEM COS Framework

- Comparative Cost of Service Studies
 - Actual cost of service study (ACOS) based on test year measured loads
 - Counterfactual cost of service study (CFCOS) based on estimated loads w/out NEM
 - Evaluate difference in class revenue requirement and revenue collected, including jurisdictional allocation savings (JAM)
- Shortcomings: single historic test year (embedded COSS); no accounting for future benefits or resource benefits



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Utah: Rocky Mountain Power Application

- RMP argued its COS shows residential C-G only paying 60% of COS, with commercial C-G schedules paying more than the cost of service (109%)
- **Not litigated**; stipulation reached agreeing to retail credit step down, beginning with 92.5% retail credit for exports (*passed through energy balancing account, similar to fuel adjustment*); C-G in transition period remain on tariff for 18 years.
- Future proceeding (now ongoing) will determine export rate, rate design addressed in future GRCs

OG&E: GRC NEM COSS

- Using 4CP allocation for production and transmission demand, unit costs of DG customers significantly lower than other schedules (DG on mandatory TOU)

Table 2. Comparative Residential Unit Cost Per Customer/Month ³⁹					
	Res-DG	Res-Std	Res-TOU	Res-VPP	Res-CPP
Customer Component	\$24.54	\$28.64	\$26.07	\$27.20	\$24.57
Energy Component	\$0.35	\$0.37	\$0.45	\$0.42	\$0.39
Demand-Production	\$17.65	\$35.19	\$38.17	\$26.44	\$29.71
Demand-Transmission	\$5.20	\$9.78	\$10.69	\$7.60	\$8.40
Demand-Distribution	\$11.03	\$13.08	\$13.19	\$14.37	\$11.89
Total	\$58.77	\$87.06	\$88.57	\$76.03	\$74.96



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OG&E: NEM COSS Study

- Lower cost of service for DG in OG&E territory, combined with other policy features, results in higher relative rate of return than other residential schedules.
- Doesn't include value of surrendered monthly net excess credits (so actually higher)

Table 1. Return on Rate Base for Residential Rate Schedules

	Total Residential Service (Col. 1)	Residential Standard (Col. 2)	Residential TOU (Col. 3)	Residential VPP (Col. 4)	Residential CPP (Col. 5)	Residential DG (Col. 6)
Line 31 (Return on	5.33	5.18	4.89	6.28	6.32	7.23



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E3 2013 NEM Evaluation COSS

- NEM, in the aggregate, meets cost of service
- Results for residential heavily driven by 4-tier rates, (highest tier ~\$0.36/kWh, no BFC)
- COSS evaluation conducted as supplement to more traditional cost-benefit analysis

	PG&E		SCE		SDG&E		All IOUs	
	Without DG	With DG	Without DG	With DG	Without DG	With DG	Without DG	With DG
Residential	171%	88%	152%	86%	101%	54%	154%	81%
Non-Residential	128%	106%	110%	105%	124%	122%	122%	112%
Total	146%	99%	122%	100%	119%	111%	133%	103%



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New Hampshire NEM 2.0 Docket

NH PUC Docket 2016-576

- Unitil (one of three utilities) presented NEM COSS results below
- No interval data available for C-G; no C-G included within load research sample
- Results based on approximations, criticized by PUC Staff witness and intervenors for being incomplete

Table 3 Earned Return by Customer Group and Cost Study

	Residential	Solar
Base	-1.48%	-12.27%
Counterfactual	-1.48%	6.08%
Solar Class	-1.46%	-15.55%



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Louisiana PSC NEM Study

Table 34: Solar NEM Customer Contributions to IOU COS (active 2013 Installations Only)

	Annual Per NEM Customer Contributions to COS		Aggregate Annual NEM Contribution to COS		Percent of COS Recovery	
	without NEM ----- (\$)	with NEM -----	without NEM ----- (\$)	with NEM -----	without NEM ----- (%)	with NEM -----
CLECO	\$ 777.59	\$ (451.19)	\$ 736,376	\$ (427,276)	157.7%	66.5%
EGSL	\$ 500.59	\$ (557.92)	\$ 230,269	\$ (256,643)	141.8%	53.4%
ELL	\$ 411.28	\$ (504.31)	\$ 929,906	\$ (1,140,238)	139.2%	51.9%
SWEPCO	\$ 946.83	\$ 57.09	\$ 608,813	\$ 36,710	190.6%	105.5%
Total IOU			\$ 2,505,364	\$ (1,787,445)	157.3%	69.3%



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Topics for further conversation

- Are existing COS methodologies sufficient?
- Does DER, AMI, and grid modernization create an opportunity to update cost classifications (energy, demand, customer)



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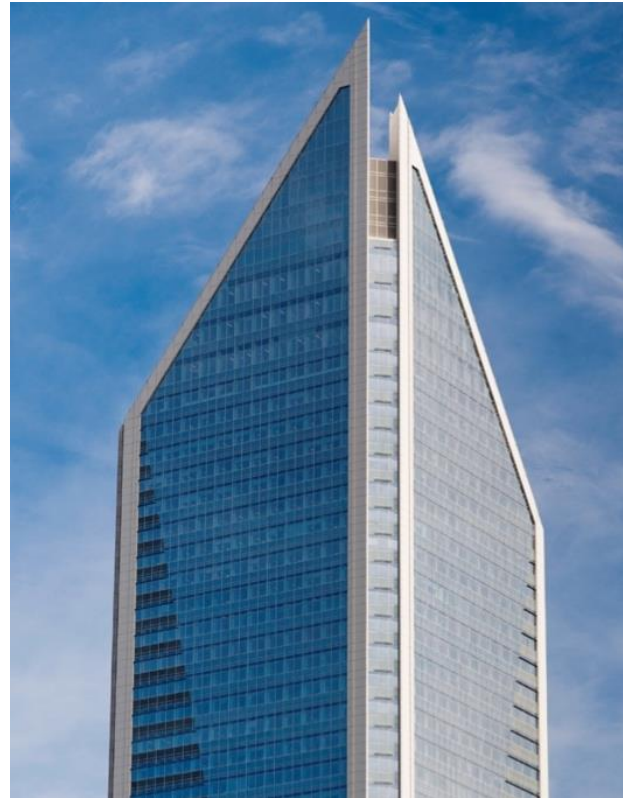
Thank You!

- Thad Culley
- thad@votesolar.org

Integrated System and Operations Planning Discussion

SC NEM Stakeholder Meeting

March 12, 2020



ISOP

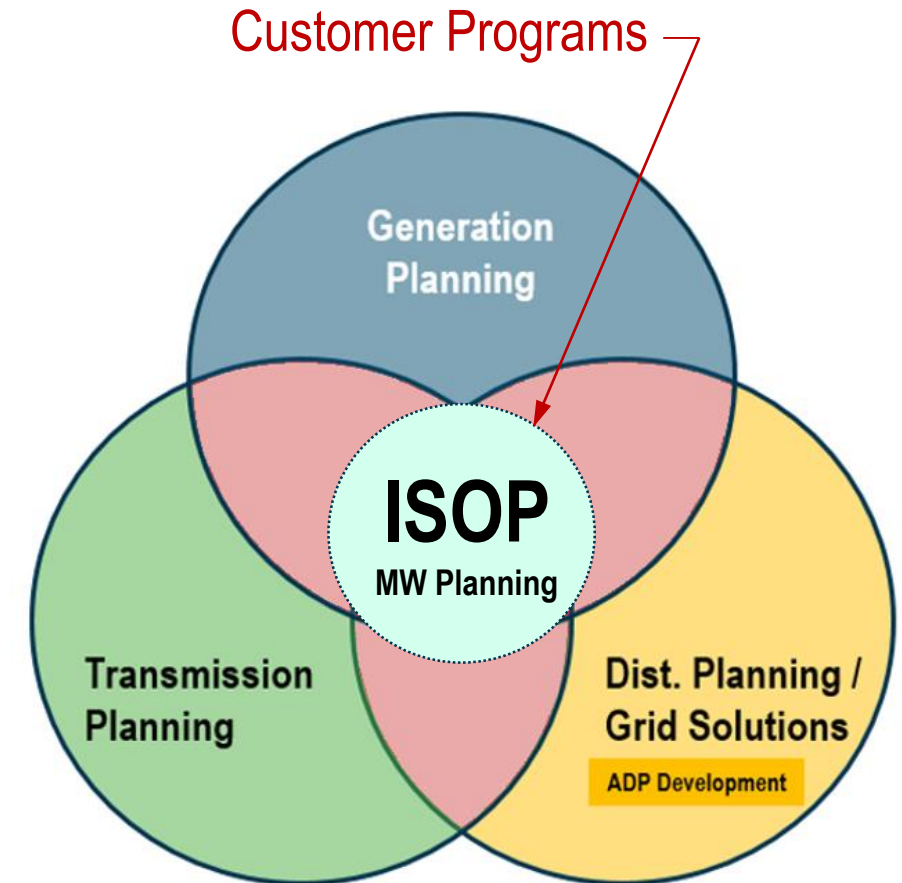
Integrated System &
Operations Planning



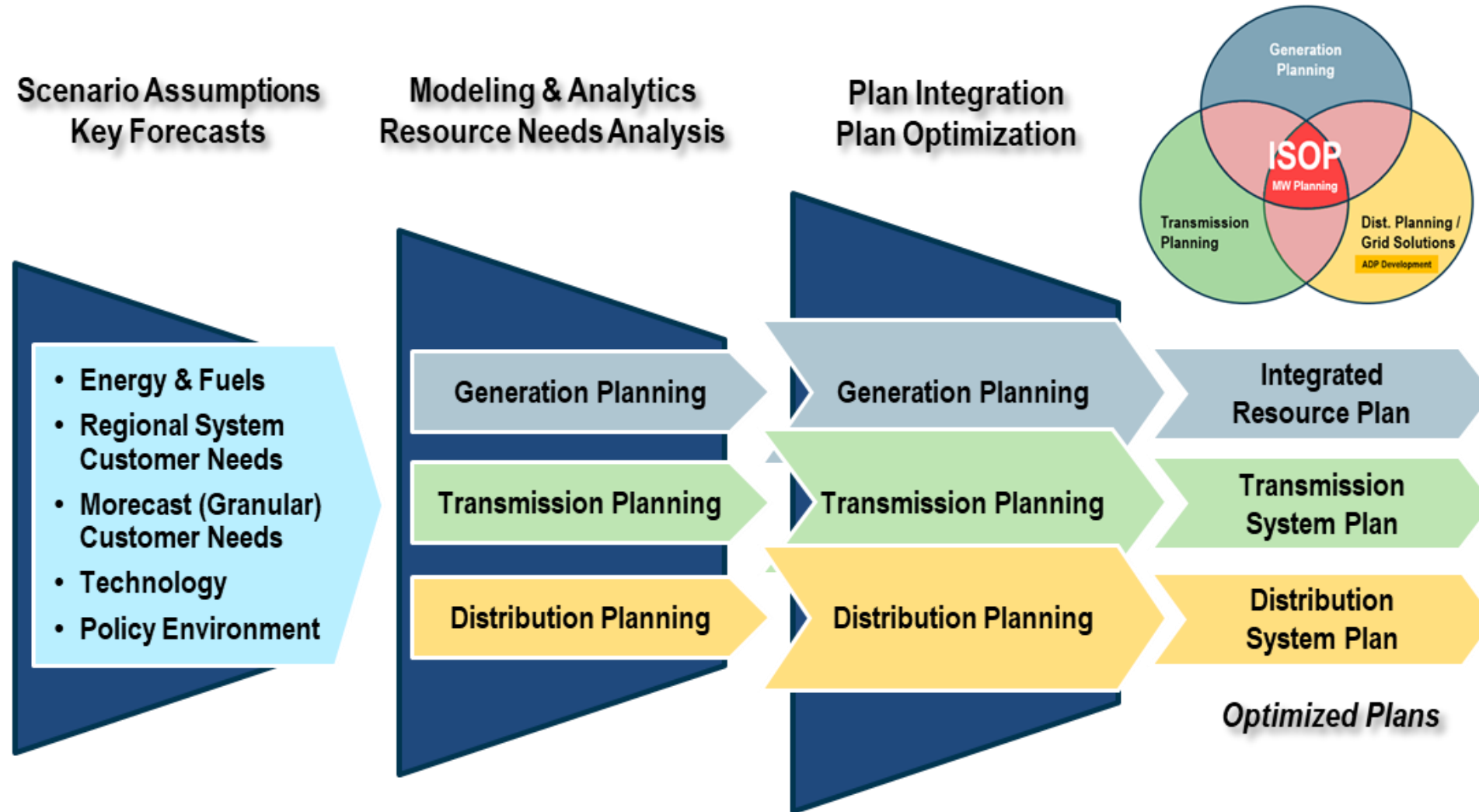
Duke's ISOP Journey

The Integrated System & Operations Planning (ISOP) vision is a planning framework that optimizes capacity and energy resource investments (MW/MWh) across Generation, Transmission, Distribution and Customer Solutions. The framework will address:

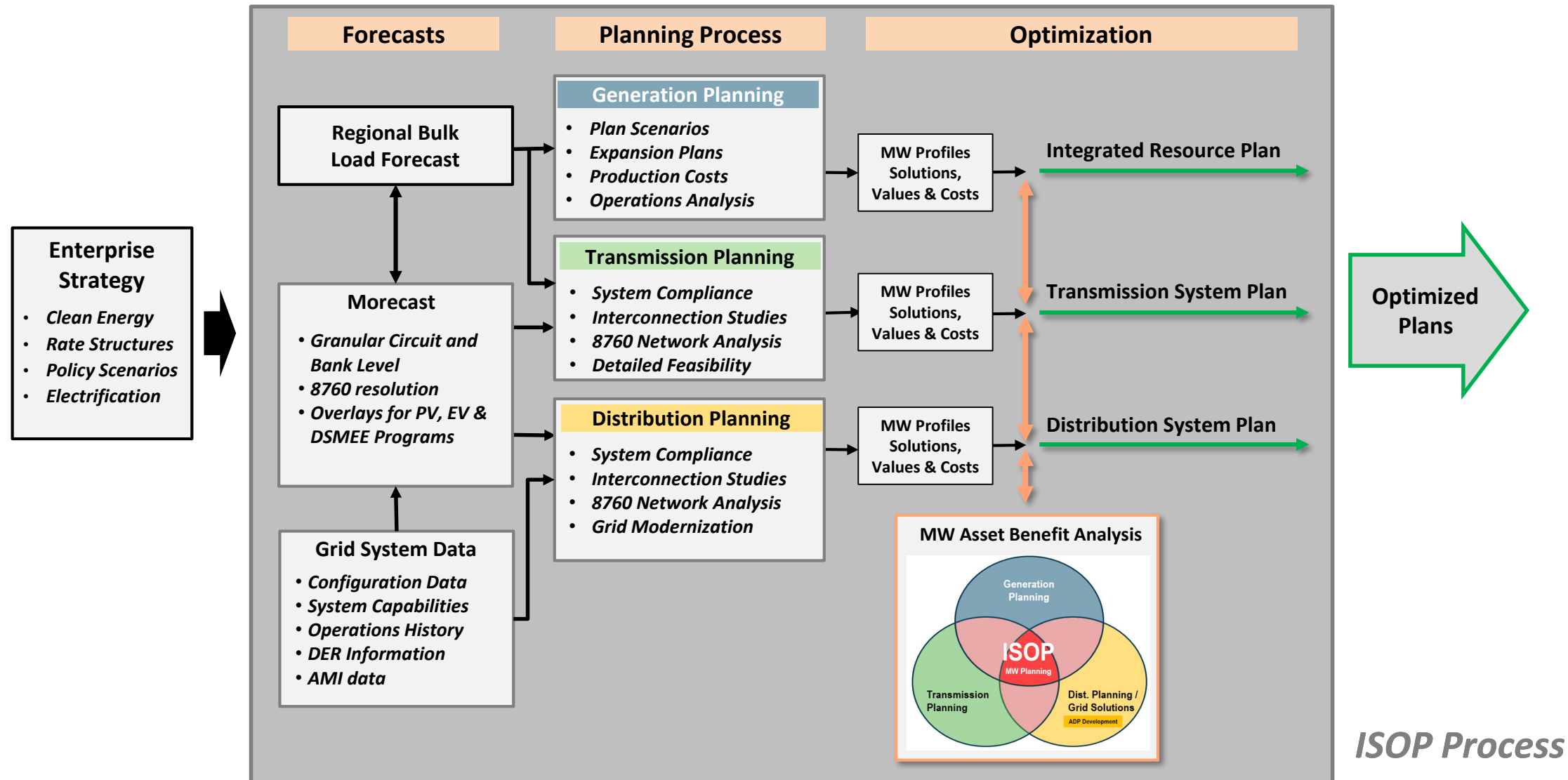
- Operationally feasible plans while accommodating rapid renewable growth
- Enhanced modeling to value new technologies such as energy storage, electric vehicles, and intelligent grid controls/customer programs (non-traditional solutions for Distribution and Transmission)
- Ability to evaluate different asset portfolios across a broader range of potential future scenarios



Duke's ISOP Journey



Aligning and Linking Process, Tools and Data



Expanding the Scope of Scenario Analysis



Supply Side

- Assumptions for new generation technologies
- Views of resource mix (central and distributed resources) and reliance on external resources
- Appropriate levels of precision for locating planned resources

Demand Side

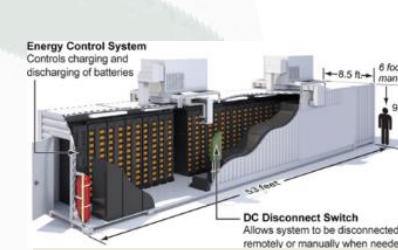
- Customer requirements and expectations in the future envisioned
- Enhanced assessment of load-modifying resources and programs
- Appropriate approach for location of new resources



Identify Points at Which Potential Plans Diverge

NTS/Storage Potential

- Expanding the view for storage needs and potential on the system
- Anticipation of storage operations and use cases for future energy network support



Grid Implications

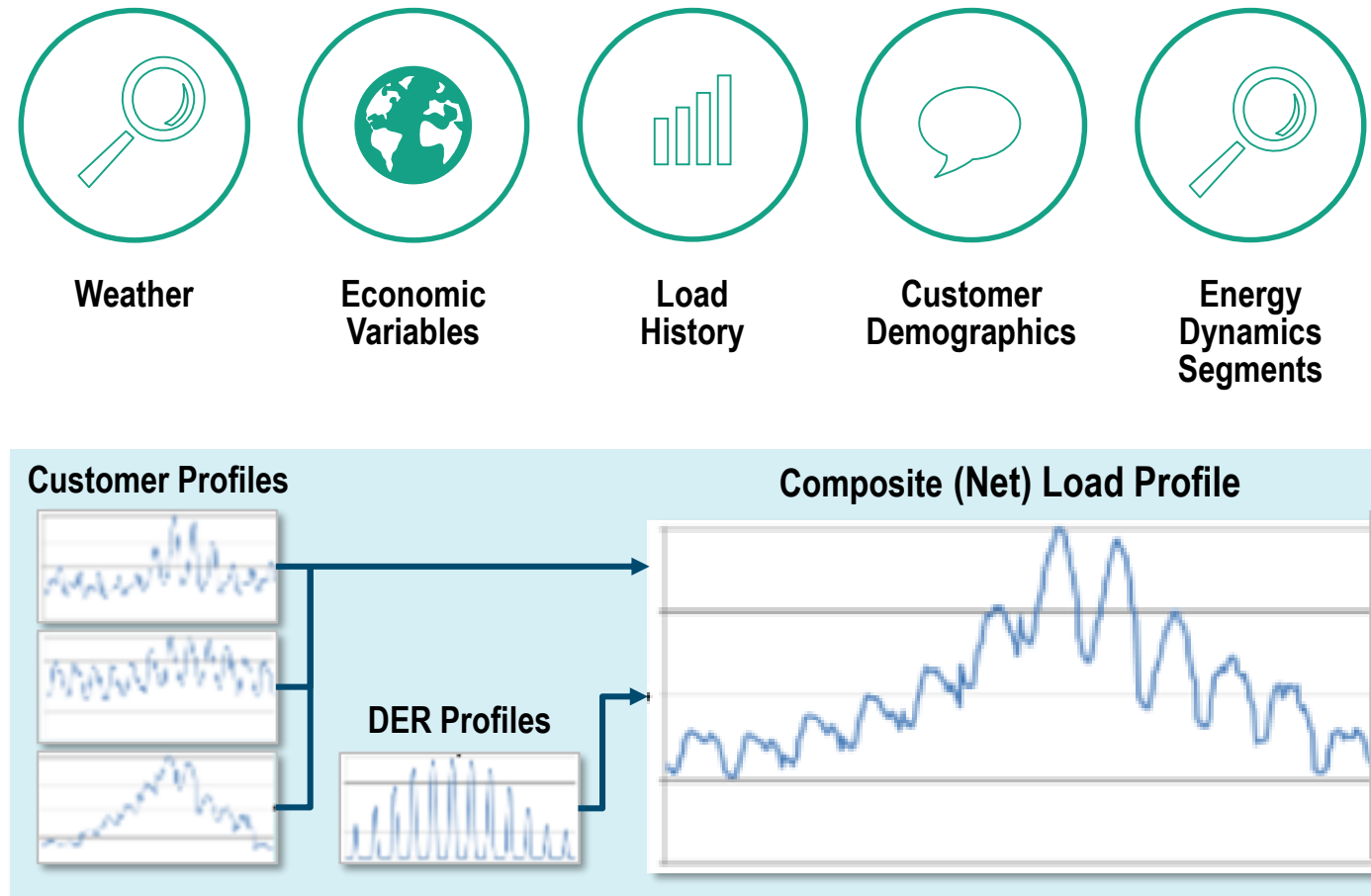
- Informed view of distributed resources and capabilities operating on the system
- Grid configurations and capabilities needed to support envisioned future operations



Granular Load Forecasting

- 10-year hourly load forecasts for each distribution circuit
- Bottom-up feeder-level forecasts inclusive of DERs and EVs (gross and net load)
- Distribution planners can make circuit-level forecast adjustments
- AMI data will be useful as it becomes available to forecasters
- The new tools will support development of forecast scenarios

These are critical new inputs for the advanced distribution planning process



Advanced Distribution Planning (ADP)

Incorporate sophisticated granular load forecasts

- Current 3-5 year window evolving to 10 years
- Forecasting is moving from individual distribution planners to load forecasters collaborating with the planners
- Developing new capabilities for multiple planning scenarios

New power flow demands

- From peak hour assessment to 8760 assessment

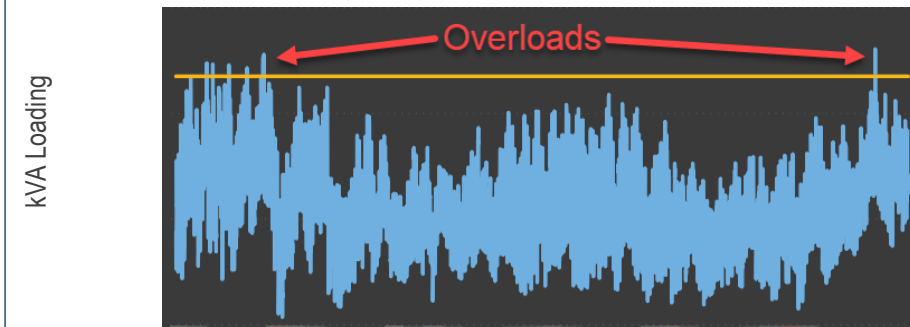
Assessment of new solutions

- DERs including battery storage systems
- Capture benefits of D-sited options for G and T

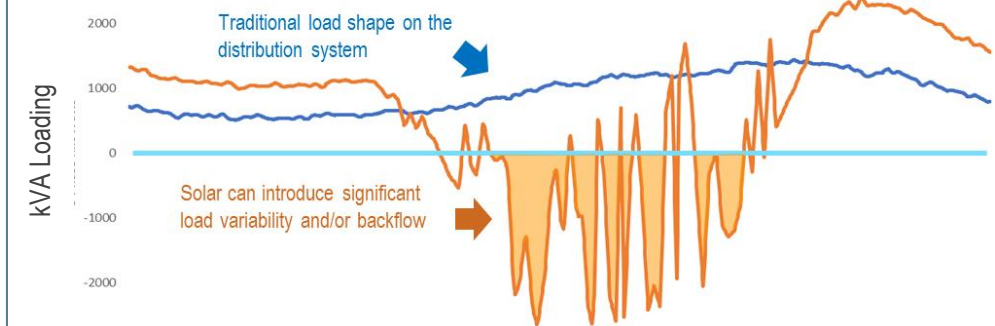
Automation of tools and configuration data

- Allows for more complex planning for a dynamic grid

Forecasted Feeder Loads and Winter Rating

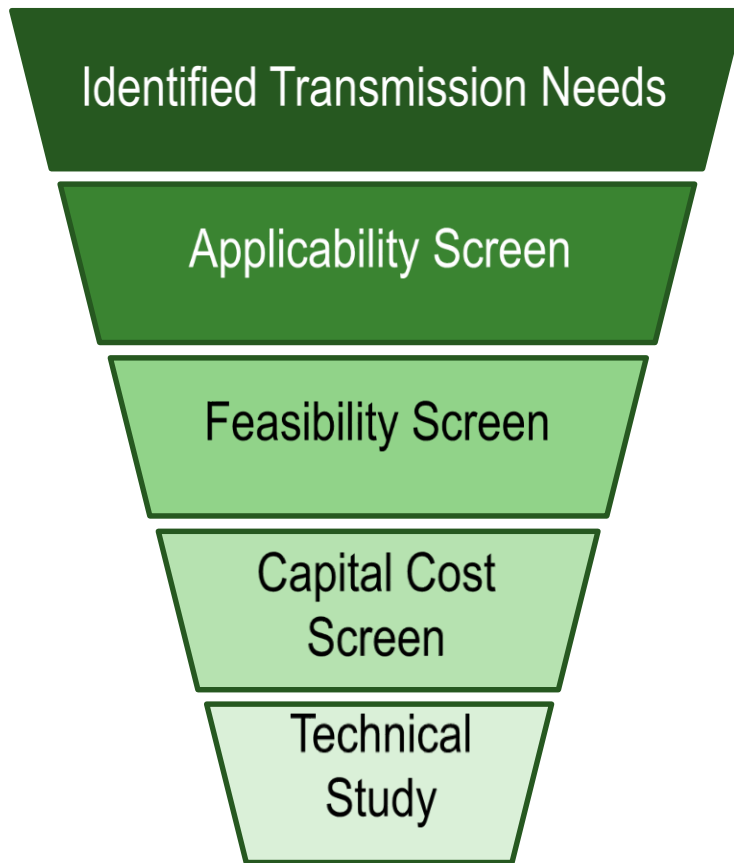


DER Impacts on Circuit Loading

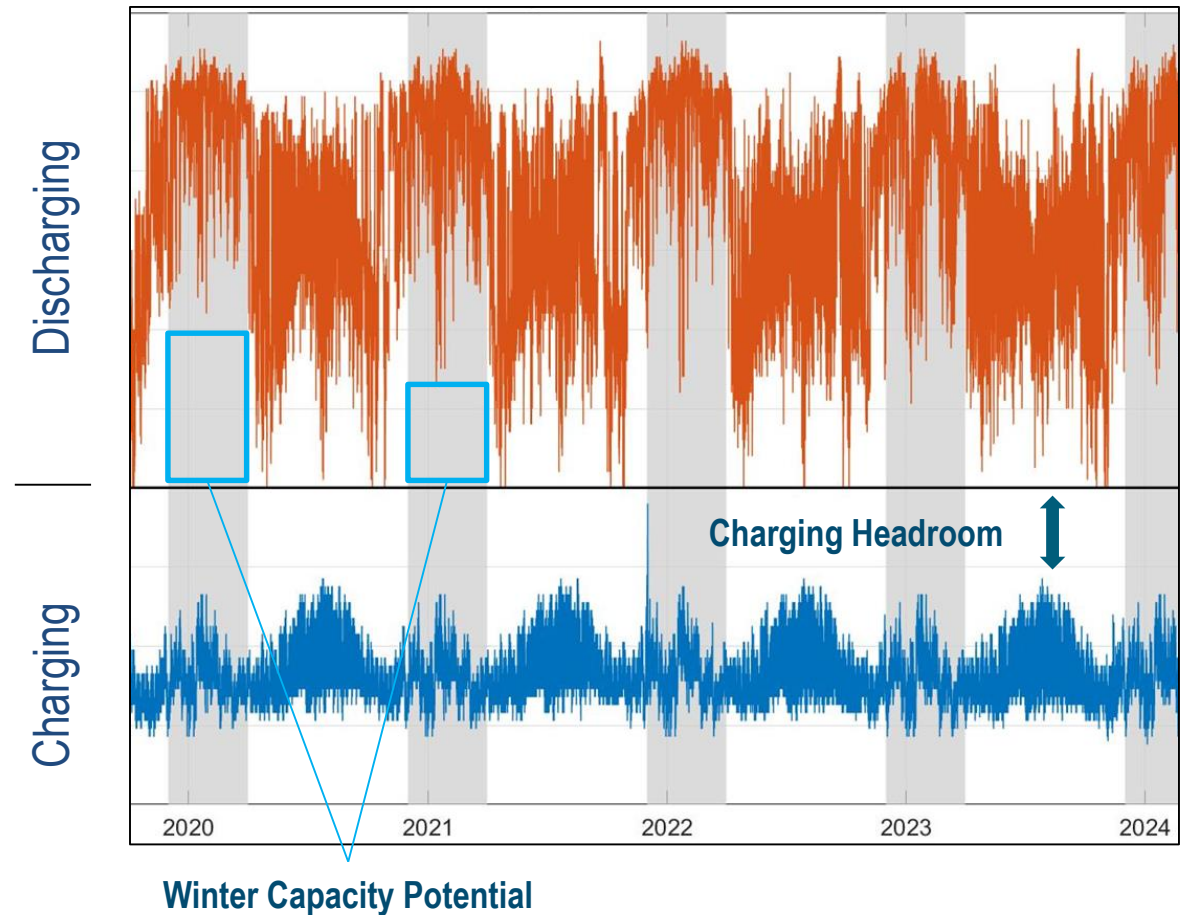


Evaluating Non-Traditional Solutions for Transmission

Screening for NTS Opportunities



8760 Power Flow Modeling (*Illustrative Battery Analysis*)



Path Forward

Increasing Stakeholder Engagement in the Carolinas

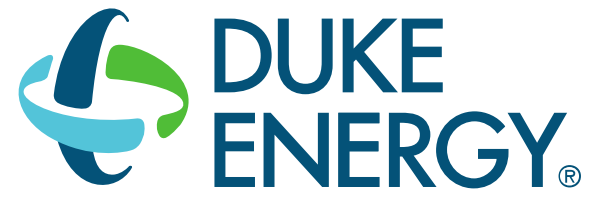
- ISOP Stakeholder Workshop Sessions and Webinars
- IRP Stakeholder Forums for the 2020 Planning Cycle
- Communicate progress and increase transparency and credibility of new tools and approaches
- Work towards a better understanding of:
 - Current accepted utility planning practices as well as future planning challenges
 - Available and relevant utility planning tools, and the gaps that we need to address
 - Stakeholders' goals, priorities and ideas to inform our approach

Interconnection Queue Reform

Develop and offer to publish DG Guidance Maps if there is interest

Objective to introduce ISOP elements in 2022 to complement the IRP process in the Carolinas





Net Energy Metering Stakeholder Meeting

April 23, 2020, 10:00 am – 12:00 pm

Remotely via GlobalMeet (link below)

[Click this link to join the meeting.](#)

Dial-In: (913)227-1201 Passcode: 158233

Agenda:

10:00 – 10:15

Welcome, Housekeeping, and Safety Briefing – Jacob Colley
March 12, 2020 Meeting Minutes – Leigh Ford

10:15 – 10:35 - Calculating Value of DER:

Value of DER according to Act 236 NEM DER Methodology – Jason Martin, Duke Energy

Direct and indirect economic impacts of NEM to the State and the value of DER components – Tyson Grinstead, Sunrun

10:35 – 11:05

Roundtable Discussion:

Direct and indirect economic impacts of NEM to the State
Other value of DER components

11:05 – 11:20

Successor Tariff and Rate Design – Lon Huber, Duke Energy

11:20 – 11:50

Roundtable Discussion:

Value in bundling with other utility programs like EE, DSM, NEM
Creative options have you seen throughout the country

11:50 – 12:00

Wrap Up and Next Steps

Contact Info:

Leigh Ford

803-528-5598

Leigh.ford@duke-energy.com

GlobalMeet Login Information:

URL - <https://dukeenergy.pgimeet.com/Act62NEM>

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Net Energy Metering Stakeholder Meeting
April 23, 2020, 10:00 am – 12:00 pm
Remotely via GlobalMeet

Welcome:

Jacob Colley of Duke Energy welcomed stakeholder participants, explained how the meeting would be conducted, and provided a safety briefing regarding safe workspaces.

March 12, 2020 Meeting Minutes:

Leigh Ford offered a final opportunity for any edits to the March 12, 2020 meeting minutes. There were no edits so the minutes are approved as submitted.

Calculating the Value of DER:

Jason Martin of Duke Energy discussed the value of DER according to Act 236 NEM DER Methodology and included explanations of all the cost/benefit categories.

Tyson Grinstead of Sunrun discussed potential direct and indirect economic impacts of NEM to the State and that South Carolina is the first state to consider these impacts. Tyson explained that direct impacts may include local goods and services, wages paid to solar installers, sales tax on panels, property purchased for a warehouse, and the daily things that are needed to run a solar business. Indirect impacts could include goods that are purchased to do business, such as solar panels, vehicles, advertising, goods purchased by solar employees, property taxes, and office.

The group discussed existing studies or tools, such as NREL, REMI, or IMPLAN, that could be considered when evaluating direct and indirect impacts. There was discussion on the definition of direct, indirect, and local benefits. Questions were asked as to the best way for these to be defined and several parties deferred to economic modeling. Tom Beach provided an analysis, "The Benefits and Costs of Distributed Solar Generation in New Hampshire" (attached) for the group's review/consideration.

Successor Tariff and Rate Design

Lon Huber of Duke Energy presented on net metering trends, ways other states have developed successor tariffs, other concepts for successor tariffs, and potential successor tariffs/rate designs. Specifically, Lon discussed developing tariffs that send price signals and the potential for a creative and wholistic approach for solar choice metering. Such examples include coupling solar with dispatchable/controllable devices, such as smart thermostats, batteries, etc.

Several participants expressed support for a creative and wholistic approach and providing customers choices.

Wrap Up and Next Steps

Leigh Ford will send the group the slides and meeting minutes. Duke will start reaching out with the stakeholders to discuss next steps and proposed tariffs.

Attendees:

<u>Attendee</u>	<u>Organization</u>
Tom Beach	Crossborder Energy
Sharad Bharadwaj	E3
Kullen Boling	Central Electric Power Cooperative
Robert Branton	Santee Cooper
Daniel Brookshire	NC Sustainable Energy Association
George Brown	Duke Energy
John Calhoun	Santee Cooper
George Cavros	Southern Alliance for Clean Energy
Maggie Clark	SEIA
Jacob Colley	Duke Energy
Ashley Cooper	Parker Poe
Thad Culley	Vote Solar
Tom Delello	Gregory Electric
Nanette Edwards	ORS
Margot Everett	Navigent
Leigh Ford	Duke Energy
Tyson Grinstead	Sunrun
Carrie Grundmann	Walmart
Karen Hall	Duke Energy
Dana Harrington	Duke Energy
Dawn Hipp	ORS
Lon Huber	Duke Energy
Maia Hutt	Southern Environmental Law Center
Bryan Jacob	Southern Alliance for Clean Energy
Alex Knowles	ORS
Robert Lawyer	ORS
Peter Ledford	NC Sustainable Energy Association
Kate Lee	Southern Environmental Law Center
Jason Martin	Duke Energy
Lyndsey McNeely	Duke Energy
Eddy Moore	SC Coastal Conservation League
O'Neil Morgan	ORS
David Neal	Southern Environmental Law Center
Justin Orkney	Duke Energy
Lisa Perry	Walmart
Gretchen Pool	ORS
Marcus Preston	Duke Energy
Cole Price	Central Electric Power Cooperative
Jim Rabon	Santee Cooper
Shelley Robbins	Upstate Forever
John Rouff	AARP
Ben Smith	NC Sustainable Energy Association
Kim Smith	Duke Energy
Mark Svrcek	Central Electric Power Cooperative
Ryder Thompson	ORS
Neal Williams	Lockhart Power
Bruce Wood	Sunstore

Welcome!

Net Energy Metering Stakeholder Meeting
April 23, 10:00 am – 12:00 pm

Welcome, Housekeeping, and Safety Briefing

– Jacob Colley

March 12, 2020 Meeting Minutes and Breakout Session Overview

– Leigh Ford

Value of Solar Methodology and Components

Jason Martin, Duke Energy



Act 62's Requirements

Section 58-40-20 (D)(3) states that:

In evaluating the costs and benefits of the net energy metering program, the commission shall consider the value of distributed energy resource generation according to the methodology approved by the commission in Commission Order No. 2015-194

NEM Proceeding – Value of Solar
DOCKET NO. 2014-246-E – ORDER NO. 2015-194

- Established methodology with Act 236 proceeding to identify the value a solar generator paired with a load center has to the utility.
- Identified the utility costs/benefits by the customer-generator from solar generation at their home or facility
- Methodology includes 11 components to be used in calculating Value of Solar.
- Components can be positive, negative or zero in value.
- Calculation is refreshed with the utility's annual fuel proceeding.

Act 236 Established VoS Components

Net Energy Metering (“NEM”) Methodology

- +/- Avoided Energy
- +/- Energy Losses/Line Losses
- +/- Avoided Capacity
- +/- Ancillary Services
- +/- Transmission and Distribution (“T&D”) Capacity
- +/- Avoided Criteria Pollutants
- +/- Avoided CO2 Emission Cost
- +/- Fuel Hedge
- +/- Utility Integration & Interconnection Costs
- +/- Utility Administration Costs
- +/- Environmental Costs

= Total Value of NEM Distributed Energy Resource

Component Description

Methodology Component	Description	Calculation Methodology/Value
+/- Avoided Energy	Increase/reduction in variable costs to the Utility from conventional energy sources, i.e. fuel use and power plant operations, associated with the adoption of NEM.	Component is the marginal value of energy derived from production simulation runs per the Utility's most recent Integrated Resource Planning ("IRP") study and/or Public Utility Regulatory Policy Act ("PURPA") Avoided Cost formulation.
+/- Energy Losses/Line Losses	Increase/reduction of electricity losses by the Utility from the points of generation to the points of delivery associated with the adoption of NEM.	Component is the generation, transmission, and distribution loss factors from either the Utility's most recent cost of service study or its approved Tariffs. Average loss factors are more readily available, but marginal loss data is more appropriate and should be used when available.
+/- Avoided Capacity	Increase/reduction in the fixed costs to the Utility of building and maintaining new conventional generation resources associated with the adoption of NEM.	Component is the forecast of marginal capacity costs derived from the Utility's most recent IRP and/or PURPA Avoided Cost formulation. These capacity costs should be adjusted for the appropriate energy losses.

Component Description

Methodology Component	Description	Calculation Methodology/Value
+/- Ancillary Services	Increase/reduction of the costs of services for the Utility such as operating reserves, voltage control, and frequency regulation needed for grid stability associated with the adoption of NEM.	Component includes the increase/decrease in the cost of each Utility's providing or procurement of services, whether services are based on variable load requirements and/or based on a fixed/static requirement, i.e. determined by an N-1 contingency. It also includes the cost of future NEM technologies like "smart inverters" if such technologies can provide services like VAR support, etc.
+/- T&D Capacity	Increase/reduction of costs to the Utility associated with expanding, replacing and/or upgrading transmission and/or distribution capacity associated with the adoption of NEM.	Marginal T&D distribution costs will need to be determined to expand, replace, and/or upgrade capacity on each Utility's system. Due to the nature of NEM generation, this analysis will be highly locational as some distribution feeders may or may not be aligned with the NEM generation profile although they may be more aligned with the transmission system profile/peak. These capacity costs should be adjusted for the appropriate energy losses.
+/- Avoided Criteria Pollutants	Increase/reduction of SO _x , NO _x , and PM ₁₀ emission costs to the Utility due to increase/reduction in production from the Utility's marginal generating resources associated with the adoption of NEM generation if not already included in the Avoided Energy component.	The costs of these criteria pollutants are most likely already accounted for in the Avoided Energy Component, but, if not, they should be accounted for separately. The Avoided Energy component must specify if these are included.

Component Description

Methodology Component	Description	Calculation Methodology/Value
+/- Avoided CO ₂ Emissions Cost	Increase/reduction of CO ₂ emissions due to increase/reduction in production from each Utility's marginal generating resources associated with the adoption of NEM generation.	The cost of CO ₂ emissions may be included in the Avoided Energy Component, but, if not, they should be accounted for separately. A zero monetary value will be used until state or federal laws or regulations result in an avoidable cost on Utility systems for these emissions.
+/- Fuel Hedge	Increase/reduction in administrative costs to the Utility of locking in future price of fuel associated with the adoption of NEM.	Component includes the increases/decreases in administrative costs of any Utility's current fuel hedging program as a result of NEM adoption and the cost or benefit associated with serving a portion of its load with a resource that has less volatility due to fuel costs than certain fossil fuels. This value does not include commodity gains or losses and may currently be zero.
+/- Utility Integration & Interconnection Costs	Increase/reduction of costs borne by each Utility to interconnect and integrate NEM.	Costs can be determined most easily by detailed studies and/or literature reviews that have examined the costs of integration and interconnection associated with the adoption of NEM. Appropriate levels of photovoltaic penetration increases in South Carolina should be included.

Component Description

Methodology Component	Description	Calculation Methodology/Value
+/- Utility Administration Costs	Increase/reduction of costs borne by each Utility to administer NEM.	Component includes the incremental costs associated with net metering, such as hand billing of net metering customers and other administrative costs.
+/- Environmental Costs	Increase/reduction of environmental compliance and/or system costs to the Utility.	The environmental compliance and/or Utility system costs might be accounted for in the Avoided Energy component, but, if not, should be accounted for separately. The Avoided Energy component must specify if these are included. These environmental compliance and/ or Utility system costs must be quantifiable and not based on estimates.

Thank You

Discussion

Economic Impact

Tyson Grinstead
Director, Public Policy
Sunrun

Economic Impact

- 58-20-40 (D)(4):
 - “The direct and indirect economic impact of the net energy metering program to the State”
 - Who has done this before?
 - What did the legislature intend?
 - What is the best way to handle this variable?
 - How many jobs have been created?
 - How much income reinvested in the local economy?
 - How much tax revenue has been generated?

What should be included?

- Direct
 - Purchasing local goods, services, property, labor. *For example, wages paid to solar installers, sales taxes, or property purchased for a warehouse.*
- Indirect
 - Goods purchased in order to do business or as a result of doing business. *For example, solar panels, trucks, advertising, goods purchased by solar employees with wages, property taxes.*

Successor Tariffs and Rate Design

Lon Huber, VP Rate Design and Strategic Solutions

April 23, 2020

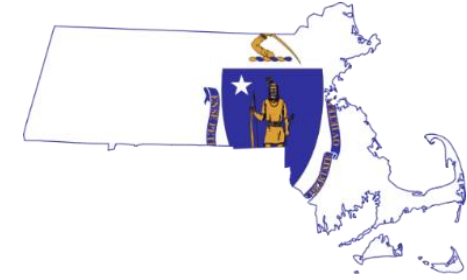


Agenda

- NEM 2.0 Trends
- Successor Tariffs and Rate Design
- Act 62 Tariff
- Innovative Solutions

Red, Purple and Blue States – Beyond NEM 1.0

- Nevada
- Maine
- Massachusetts
- Connecticut
- Indiana
- California
- Michigan
- Hawaii
- New Hampshire
- Utah
- Louisiana
- Arizona



NEM 1.0 Augments & Alternatives – Tools in the Toolbox

- Standby Charges
- Value of Solar Rate
- Feed-in Tariffs
- Grid Access Charge
- Net Billing
- Buy-all, Sell-all
- Higher Customer Charge
- Non-bypassables
- Demand Charges
- Separate Rate Class
- Time of Use (TOU) Rates
- V-DER Tariffs
- Least Cost Procurement
- Community Solar
- Load Factor Adjuster
- Minimum Bill



Primary Paths Away from NEM 1.0

	Fixed charge -or- Non-bypassable	Three-part rate -or- Time-of-use	Avoided cost -or- Proxy-based	Example Jurisdiction
Retail Rate Offset	X	X	N/A	APS (2013) CA (2016) MA (2016)
Net Billing	X	X	X	Hawaii (2015) AZ (2016) New York (2017) Michigan (2018)
Outside of Retail Rate	X	X	X	Austin (2012) TEP (2018) Maine (2017) CT (2018)

■ Retail Rate Offset

- Customers are credited for self-consumption and exports at the same rate according to the underlying retail tariff. However, additional charges including grid access fees and non-bypassable charges are applied.

■ Net billing & Export Differential

- Customers are credited for excess solar exported to the grid at a monetary rate that can be different (lower) than the self-consumption offset rate.
- In the extreme – no credit or an export ban.

■ Outside of Retail Rate

- Compensation based on production of the PV system at a rate decoupled from a customer's underlying retail rate – typically a “buy-all, sell-all” arrangement.

Source: Adapted from *Lon Huber - Navigant*

Net Billing/Export Differential Flavors

- Monthly netting

- New Hampshire 2017
- Nevada 2017
- Indiana 2018

- Hourly netting

- New York 2017 (V-DER)

- Sub-hourly netting

- Utah (15 min) 2017

- Real time netting

- Arizona 2016
- Hawaii 2015
- Michigan 2018
- Louisiana 2019

- Export value step-downs have been utilized in AZ, NY and NV

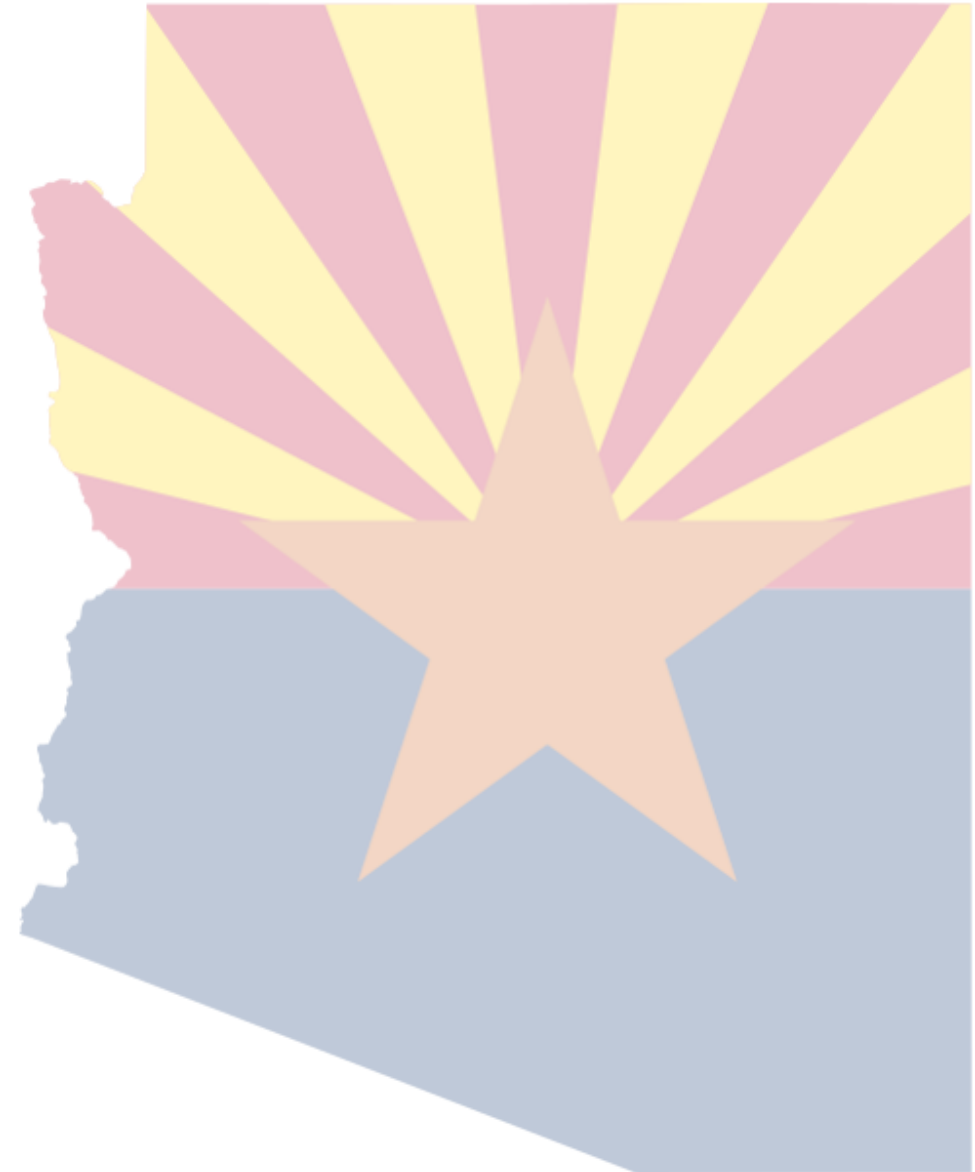


*Assuming a material spread between the retail rate and the export rate

Source: Adapted from *Lon Huber - Navigant*

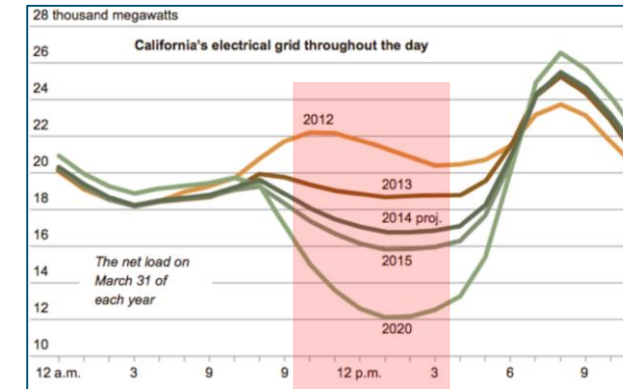
Arizona Overview

- **Net Billing**
 - Arizona Corporation Commission passed Net Billing in December 2016
 - **Real-time netting**
- **Export Differential**
 - Utility's exported energy rate to be decided in each rate case using avoided cost methodology or resource comparison proxy (RCP)
 - Locked in for 10 years
 - **Currently using RCP – Rolling 5-year weighted average of utility-scale portfolio price.**
 - Limited to 10% reduction per year
 - Recovered through Fuel Adjustor and Renewable Tariff
- **Separate rate class**
 - **Mandatory TOU**
 - Self consumption rate determined by cost of service study
- **Grid Access Fee**
 - Based on capacity of DG system

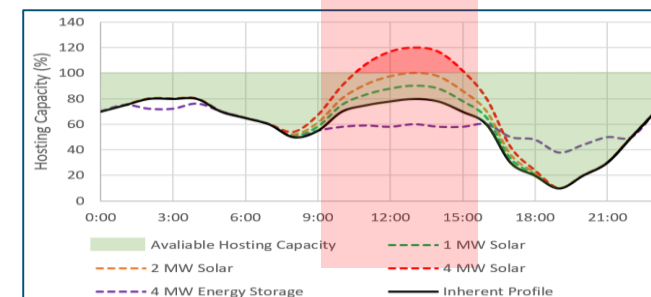


Hawaii Overview

- Smart Export
 - No export compensation during mid-day
- Grid Supply Plus
 - Real time netting
 - Export compensation at avoided cost but remote curtailment enablement
- New inverter and interconnect standards:
 - Voltage and Frequency Ride-Through to improve power system stability
 - Frequency-watt (for over frequency only at this stage) to improve frequency stability
 - Volt-var function to resolve and reduce voltage constraints
 - Volt-watt function is defined but currently not activated until further studies into curtailment effects are undertaken



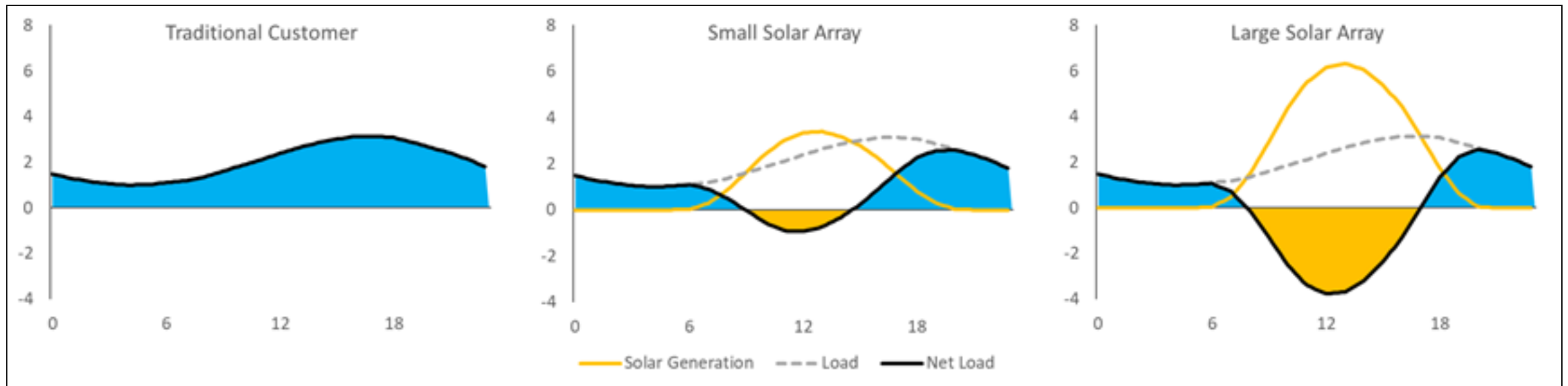
Credit Rates and Export Windows for Interim Smart Export Program for the HECO Companies			
12 a.m. – 9 a.m.		9 a.m. – 4 p.m.	4 p.m. – 12 a.m.
O'ahu	14.97 ¢/kWh	No credit	14.97 ¢/kWh
Hawai'i Island	11.00 ¢/kWh		11.00 ¢/kWh
Maui	14.41 ¢/kWh		14.41 ¢/kWh
Moloka'i	16.64 ¢/kWh		16.64 ¢/kWh
Lāna'i	20.79 ¢/kWh		20.79 ¢/kWh
The export credit rates will remain fixed for five (5) years.			



Source: Adapted from Lon Huber -
Strategen

Act 62 Basic

- Net Billing
 - Real time netting
 - Monetary credit for all exports at avoided cost plus potential adders
- Self-consumption
 - Standard rate



Solar Choice Plus Tariff

- Comprehensive approach
 - Solar Choice
 - Ensure fair and timely recovery of shared infrastructure and program costs
 - Manage excess exports closer to actual system use
 - Energy Efficiency and Demand Response
 - Time of use rates with dynamic and/or demand price signals
 - Align offering to power system need to ensure fair compensation to solar customers commensurate with system benefits for all customers
 - Bundling Opportunity - Think “solar +”
 - Incorporate additional technology

Thank You

Discussion

Next Steps – Leigh Ford

Thank you! Be safe!